N THIS ISSUE: Taking the Central Station Customer Into Partnership

JOURNAL OF ELECTRICITY

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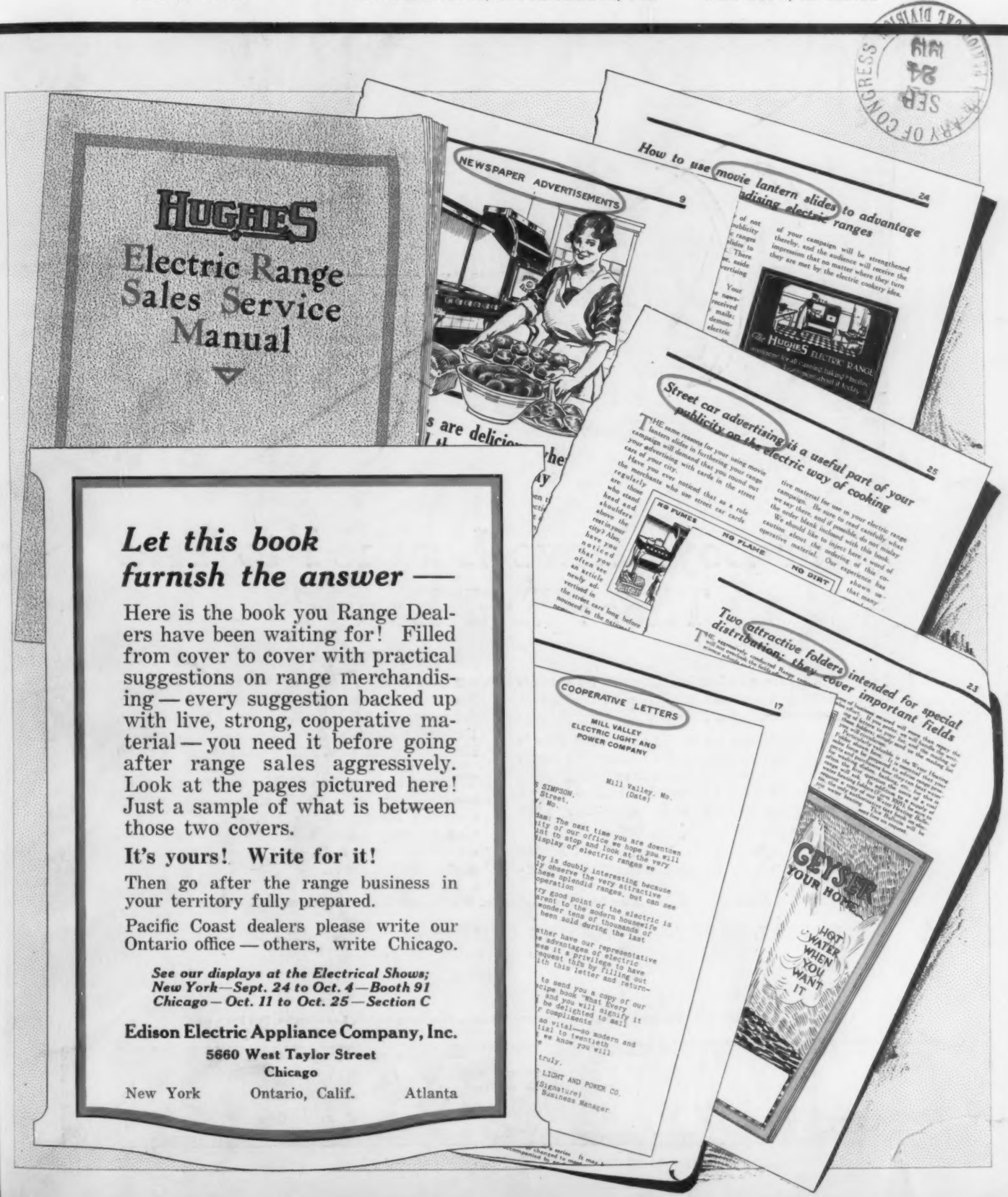
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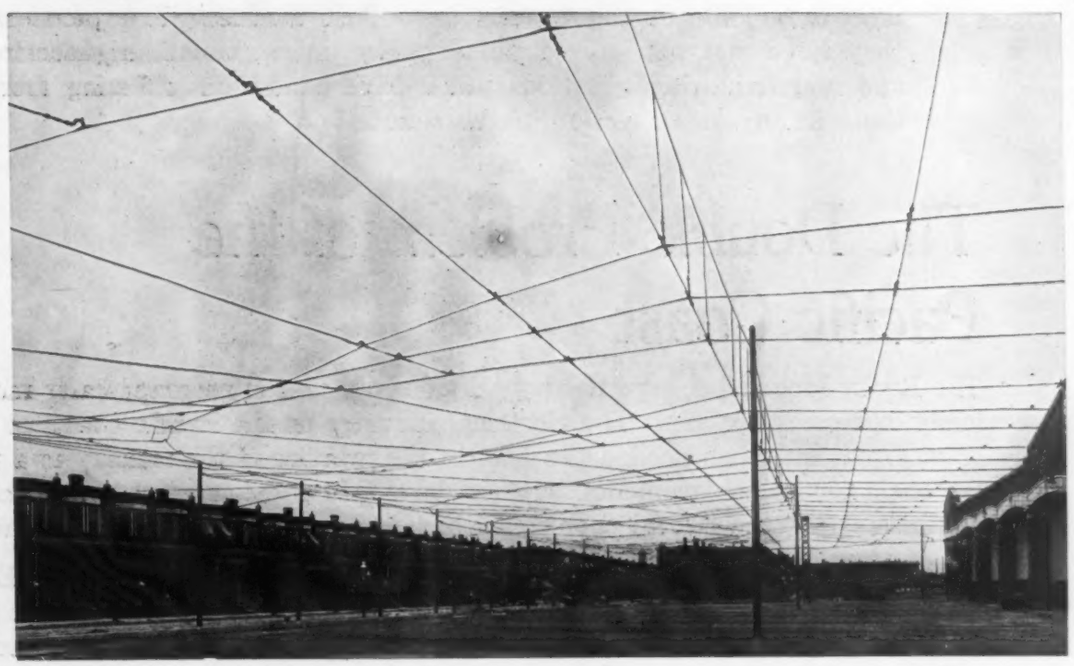

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Electrical men of the Pacific Coast have had a double problem to meet in building up the America beyond the Rockies. True pioneers, they have met and solved public policy, management, engineering and merchandising questions under local conditions differing from those in any other section of the country.

The Double Problem of the Pacific Coast

The Rocky Mountains have not only divided our nation geographically and climatically, but commercially. The electrical industry on the Pacific Coast, as a consequence, not only has needed the best of the practice of the country as a whole as the basis for its achievements, but has developed a cooperative spirit and methods in meeting these local problems which have set an example to the industry.

Three publications have served the electrical men on the Pacific Coast: Electrical World, Electrical Merchandising and the Journal of Electricity. The purpose and function of these journals has been to help the men of the coast solve this double problem.

Serving All Needs of All Readers

The Electrical World has brought to the readers of the Coast the vision of the industry as a whole. In editorials, in special articles, in news departments, its editors have sought to aid the readers in the states beyond the Rockies not only by bringing the best practice of the East to the West, but in bringing the West to the East and so developing a national understanding of the public policy, along management, engineering and industrial lines to help the West.

Electrical Merchandising, similarly, has in its special field sought to lead and inspire and instruct those men who were looking for better ways to sell appliances and supplies, no matter where they were located.

Journal of Electricity has been the spokesman for the electrical industry in the West and has found its place as a leader of Western thought in the intimate presentation of Western power and sales problems from a Western viewpoint.

to the Pacific Coast

The Practical Answer

To extend and to deepen the service of all three journals to Pacific Coast readers, their publishing activities have been affiliated and the electrical men of the industry have available a coordinated editorial service never before matched.

Electrical World, Electrical Merchandising and Journal of Electricity may now be purchased in the following combinations:

Electrical World, "The Voice of the Industry," 52 issues, containing the best thought of the whole industry on engineering and technical problems, public policy, management and the vital weekly trade and industrial news.

Electrical Merchandising, The retail sales and trade journal, monthly, presenting articles and departments showing how to sell more goods, how to run a profitable retail and contracting business, how to take advantage of the broad trade movements of the industry.

Journal of Electricity, Devoted to the upbuilding of the electrical industry in the West, specializing in the detailed handling of the engineering, central station, and trade problems in the Western States, supplementing the service of Electrical World and Electrical Merchandising in their respective fields, the instruction book for working out in detail the Pacific Coast problem.

TO MAKE IT POSSIBLE for every reader of the Journal of Electricity to determine for himself the value of this combined editorial service of three papers, until January first, we will accept combination subscriptions at the following rates:

1—Journal of Electricity and Electrical Merchandising, $3.50—extra zone postage, 25c

(The individual subscription price of these papers is: Journal of Electricity $2.50, Electrical Merchandising $2.00; total $4.50. Extra zone postage west of the Mississippi for Electrical Merchandising, 25c.)

2—Journal of Electricity and Electrical World, $6.00—extra zone postage, $1.00

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3—Journal of Electricity, Electrical World and Electrical Merchandising, $7.50—extra zone postage, $1.25

(The individual subscription price of these papers is: Journal of Electricity $2.50, Electrical World $5.00, Electrical Merchandising $2.00; total $9.50. Extra zone postage west of the Mississippi, $1.25.)

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The Voice of the Industry

Electrical Merchandising
Serving the Electrical Trade

Journal of Electricity
Devoted to the Upbuilding of the West

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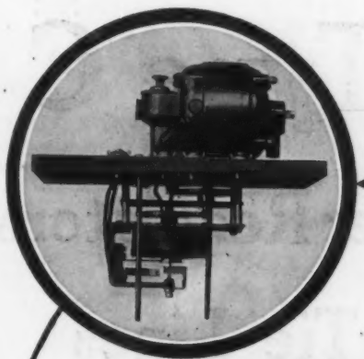
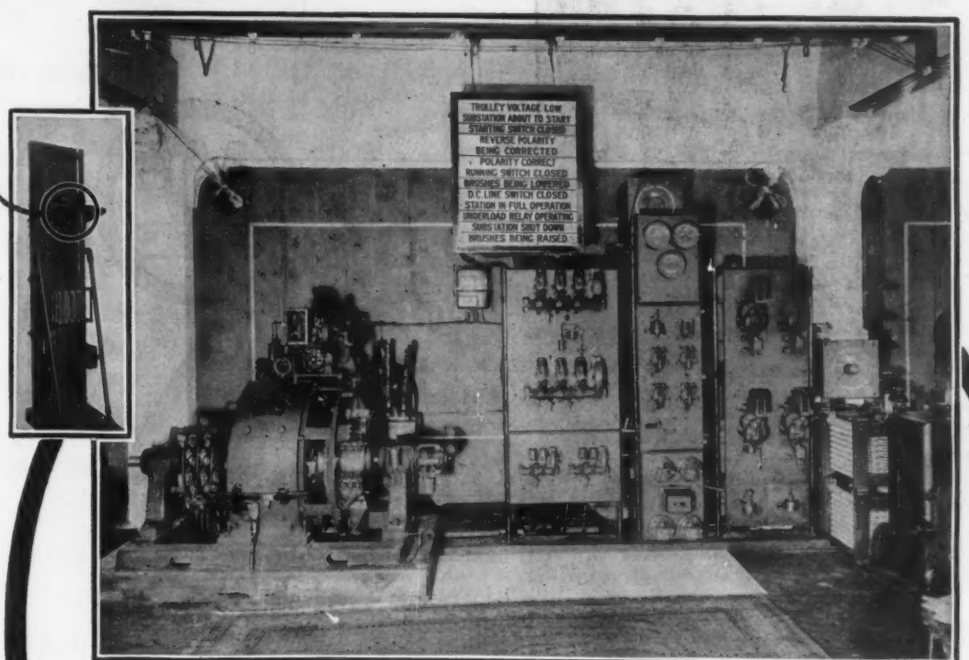


The Thermal Element of the Thermostat protects the machine bearings from injury due to overheating.



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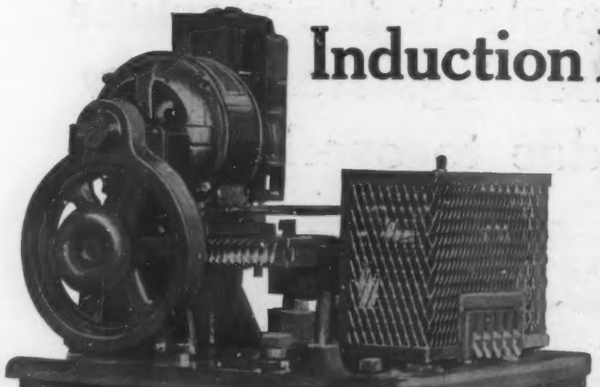
Westinghouse

Westinghouse Type C

Induction Feeder Regulators

For Tie Lines



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WESTINGHOUSE ELECTRIC

Westinghouse Induction Feeder Regulators render reliable service at all times, even with the most severe power or line-voltage disturbances. They are, therefore, particularly well adapted for use on interconnected feeders and tie lines.

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Protection against voltage surges is afforded by mica slot insulation.

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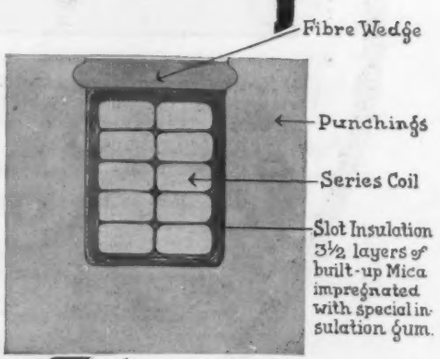
Illinois Electric Co., Los Angeles



Secondary Coil Section, including portion of Punchings.

Westinghouse

JOURNAL OF ELECTRICITY

FOUNDED 1887

ROBERT SIBLEY, Editor — CLOTILDE GRUNSKY, Associate

VOLUME 43 — SAN FRANCISCO, SEPTEMBER 15, 1919 — NUMBER 6

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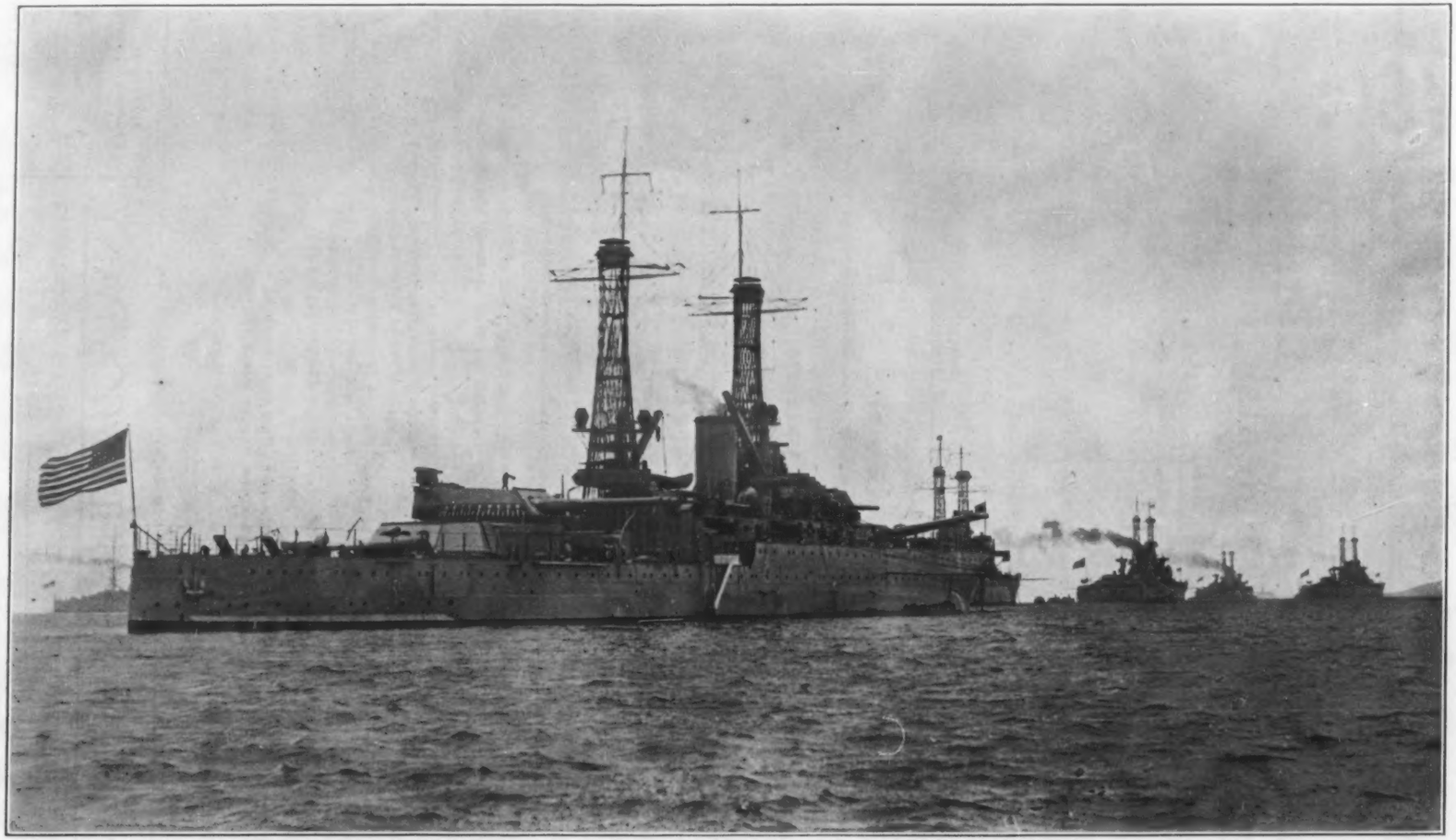

THE SUCCESS OF THE ELECTRIC BATTLESHIP.—The famous electrically driven New Mexico as the flag ship of the Western fleet has played an important part in the gala events of the fleet's present visit to Pacific ports. Not only has the electric drive proven satisfactory in the simplicity of its operation and the economy of space and elasticity of arrangement which it makes possible, but it has already established a world's record in the economy of fuel through all ranges of speed. The interest of the navies of the entire world has been focused on this latest advance in naval construction and there seems to be no question but that the battleship of the future will be electrically propelled and fitted throughout. It is a matter of pride to the electrical West that this finest ship of the American navy should be named after a Western state and that the sister ship of this type now under way should also be a Western product, built at Mare Island Navy Yard, and named the California.

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SEP.22 1919

JOURNAL OF ELECTRICITY

DEVOTED TO THE UPBUILDING OF THE ELECTRICAL INDUSTRY IN THE WEST AND IN THE COUNTRIES BORDERING THE GREAT PACIFIC

Volume 43 SAN FRANCISCO, SEPTEMBER 15, 1919 Number 6

(Copyright 1919 by Technical Publishing Company)

ANNOUNCEMENT BY JAMES H. McGRAW

PRESIDENT McGRAW-HILL COMPANY, INC.

In former years I have visited this beautiful section of our nation west of the Rocky Mountains, felt its charms, and returned to the East enthused with the vast business possibilities here. My present visit has already lasted six weeks, and in this time I have from the High Sierras to the Sea undertaken a personal inspection of what men of the electrical industry are doing here, and have noticed with unusual interest the splendid vision of engineering and industrial possibilities you have in store in this growing section of our nation.

In making my observations here I could not help but note the effective work the Journal of Electricity is doing in fostering your vision of things electrical on the Pacific Coast, and it has been with an earnest desire to bring about a means whereby the Journal of Electricity can be used more effectively in supplementing the bigger work of Electrical Merchandising and Electrical World in carrying this magnificent vision to the entire nation and to the world at large that announcement is here made that in future the Journal of Electricity will be affiliated with the family of engineering and technical papers published by the McGraw-Hill Company, making eleven in all.

These three electrical papers will enable us to intensively carry your vision in the West to the East. People of the East have a full appreciation of the Western climate as ideal for play and rest, but have you in a large way shown them what this climate means industrially—that the manufacturers can produce here more cheaply, given equal wage and material costs, than elsewhere, because of climatic advantages and because of your vast natural resources in agriculture, minerals and water power, and your enthusiastic spirit of daring in engineering and commercial endeavor?

This is the new vision for which the East is looking and Electrical World, Electrical Merchandising, and Journal of Electricity are at your service to carry this great message home. The Editor of the Journal of Electricity, Mr. Robert Sibley, formerly professor of Mechanical Engineering at the University of California, and professor of Electrical Engineering at the University of Montana, will become Pacific Coast Editor of Electrical World and Electrical Merchandising, and the Journal of Electricity will continue to be published in San Francisco.

In this new vision of things Journal of Electricity will in its local field—in the Americas west of the Rockies—continue its magnificent upbuilding work now a tradition of thirty-two years standing. Electrical World, the voice of the electrical industry, will carry the message of the engineer in the West to the nation as a whole and to the world at large, while Electrical Merchandising will devote with even added effective emphasis its columns and editorial worth toward carrying to every state of the Union the vision of cooperative helpfulness in merchandising of electrical ware that has been developed on the Pacific Coast to such a high degree of attainment.

The New Vision for 1920

Thoughtful men see in the year 1920 a year of unusual promise for the West. Three conventions of vast importance to the electrical industry the world over are to have their national setting west of the Rocky Mountains during the Spring of next year. The success of these conventions, the National Electric Light Association at Los Angeles, the National Association of Electrical Supply Jobbers at Del Monte, and the World Foreign Trade Congress at San Francisco—means much for the future of the West.

We must use our channels of engineering and technical expression with the highest degree of efficiency in carrying the message broadcast the nation over concerning the present wonderful development we have here, and the untold possibilities of further development in this favored district where already,

according to recent census statistics, we can show a per capita use of electricity four times the per capita use in the United States as a whole, with water powers still undeveloped equal to seventy per cent of the water powers of the nation, and yet with but 6.7% of the total population of the nation resident here.

It has fallen to the fortunate lot of the Journal of Electricity in past years to champion the great West in its wonderful development, portraying the viewpoint of a vision radiating from the West to the world without. In this same period Electrical World and Electrical Merchandising, published in New York and having national circulation, have caught this same vision and disseminated its helpful message to influential circles—national and international—not reached by the Journal of Electricity.

The question that has perplexed the editors of the three papers has been as to how these three papers, representing as they do the pulse of the electrical industry in the United States, might the better in their respective fields carry this message to the world at large along the lines of mutual co-operative helpfulness that is so emphatically the spirit of the times.

The West is to be congratulated that in the future the three great electrical papers, Electrical World, Electrical Merchandising and Journal of Electricity under the management of the McGraw-Hill Company, will carry the wonderful vision of the West to all the known world in a manner that means that our engineering and commercial vision of things electrical will reach the ear of the industry the world over in the most efficient and telling degree possible.

The Economy of the Electric Battleship

Among the many fine fighting ships coming to the Pacific Coast as part of the new Pacific Fleet, the electrically driven battleship New Mexico, chosen by Admiral Rodman as his flag ship, represents a radical departure from the old methods of transmitting power from the engines to the propellers. Instead of a rigid mechanical connection of the propelling engines to the driving shaft either direct or through complicated arrangements of turbines and reduction gears, the power of the New Mexico's steam turbines is used to generate electricity which is transmitted through cables to electric motors mounted on the propeller shafts. In comparison with the most modern geared turbine drive as used by foreign navies, which involves sixteen turbines in all with a complicated system of valves, piping, condensers and auxiliaries, the propelling machinery of the New Mexico consists of but two main turbo-generators with their condensers and four electric motors, one for each propeller.

The electric drive possesses a further advantage over the geared turbine arrangement for naval vessels in that it is possible to construct the motors with two windings, thus obtaining two speed ratios between the motors and generators. It is thus possible to vary the speed of the ship from a cruising speed of ten knots to a maximum speed of twenty-one knots by a variation in speed of the turbo-generators. By this means an exceptionally high economy in fuel consumption is obtained at the cruising speed points, thus adding to the radius of action of the vessel. Tests have shown the New Mexico to possess a higher efficiency in oil consumption throughout her full range in operating speeds than any ship of her type and class afloat.

Some of the advantages of the electric drive as installed on the New Mexico over geared turbines and other methods of propulsion may be briefly stated as follows:

1. **Simplicity and Reliability:** Under cruising conditions, one turbo-generator has sufficient capacity to supply the power required for all four propeller motors, the second turbine being cut in only when full speed is desired. In case of failure of one turbine it may be isolated immediately by merely opening a switch and all four propellers operated from the remaining turbine.

2. **Installation:** The motors may be connected to the propellers by short shafts and the turbo-generators located at any desirable part of the ship where a maximum protection against damage by torpedo and gun fire may be secured. This flexibility in location of the machinery is considered by naval experts to give an enormous advantage to the electric drive.

3. **Economy:** The saving in fuel consumption will range from fifteen to thirty per cent over direct connected turbines or reciprocating engines and ten to fifteen per cent over geared turbines.

4. **Manoeuvering Qualities:** The turbines always rotate in the same direction, reversal of the propellers being obtained by throwing a switch which reverses the motors. Also full power may be obtained on reversing. These operations may be performed instantly and accurately with no possibility of damage to the equipment by establishing a wrong connection.

5. **Weight and Cost:** The electric drive permits a considerable saving in weight as compared with the direct turbine or reciprocating engine drive, although there is but slight difference as compared with the geared turbine arrangement. There is not sufficient difference in cost to be considered of any importance.

6. **Low Maintenance Cost:** The electric drive possesses a minimum number of moving parts which are in no way subjected to injury or excessive deterioration through vibrations in the ship's structure, wear in the bearings or lack of rigidity in the mountings. The cost and delays due to maintenance and repairs may therefore be considered to be materially less than for other types of equipment.

The Importance of National Advertising

There may still remain some question in the mind of the dealer as to whether it pays him to handle nationally advertised goods on a small discount in preference to unknown material which yields a greater commission. The argument which occurs to the dealer in favor of the unadvertised appliance is ably presented by a Western contractor-dealer in the August 15th issue of the Journal of Electricity. The national advertiser's viewpoint is given elsewhere in this issue.

There is an undoubted attraction to the dealer in being permitted a sufficient leeway in returns to do his own local advertising and thus bring his store itself before the public, but successful returns from such a policy are made possible only by the fact that national advertisers have made ready the way. It is only because the idea of an electric washing machine has already been sold to the housewife that she is ready to answer the local advertisement of a machine she never heard of before. And it is not to be supposed that it would be possible to stop the flood of national advertising today and still continue to reap the golden harvest of public interest. It has been

the experience of more than one industry that an apparently impregnable position has been lost through lack of publicity. The lumber industry, for instance, just recently awoke to the fact that through lack of advertising on a big scale, they had been supplanted by concrete and plaster, brick and paper, and were in danger of completely losing their market. The national campaign now under way is the result.

The electrical industry in a very real sense is founded on selling the electrical idea through national advertising. This advertising might conceivably be generalized and carried out by a cooperative system, but it is difficult to visualize a means by which such vast sums of money as are now invested in advertising could be collected in the first place and secondly, how they could be made to yield the adequate return to those providing the money, an essential item in any practical business arrangement.

We are in large measure dependent, then, on the national advertiser, who advertises his wares to make a profit on them. Naturally, the only way in which he makes a profit is through the avenue of the dealer who passes his ware on to the public. In the interest of the industry as a whole, upon whose prosperity his own depends, the dealer cannot afford not to tie-in with national advertising.

Cooperation with the Daily Press

Complete cooperation between the daily newspaper and the electrical industry is a development soon to be attained, it is hoped, for the business benefit of both. A classic example of what full and extensive press publicity can do, in conjunction with intelligent advertising, is the steady upbuilding of the automobile industry. Because they work in almost perfect accord with manufacturers and dealers, it is possible for newspapers to issue scores of special automobile pages—whole sections—profitable at once to the newspaper, the industry, the motorist.

Much remains for the electrical industry yet to accomplish to secure similar representation before the public. Important steps have of late been taken in this direction, both in the East and the West, by newspapers working in co-operation with contractor-dealers and central stations, to build up regular pages and departments devoted to the selling of electrical wares and electrical service. Several New York, Chicago, and Cleveland papers have found that such pages are big business-builders, and all have at least one solicitor devoting his energies exclusively to the electrical trade, while some have built up a staff to handle the development. It is expected that a large San Francisco evening journal will soon launch upon this well repaying project.

Not only the large city dailies find profit in these organized "drives" by electrical concerns for more business. Let a concrete example be offered: a newspaper in a city of 35,000, in New York State, which in three weeks' time gained 20 half-pages of advertising through commissioning a special solicitor to canvass the electrical trade in that city. This was possible, of course, only because of the added business brought by the "massed advertising" and the electrical news-matter printed by the paper.

Newspapers of the West appear to be overlooking a paying prospect. Electrical interests, moreover, have by no means gained full value from coordinated advertising. This whole field needs cultivation. It must be done in a broad way, so that the press shall formulate a definite helpful policy toward the electrical industry. It is a progression which electrical development organizations throughout the West, such as the California Electrical Cooperative Campaign, might profitably promote.

Engineers for Engineering Positions

The resignation of A. E. Chandler from the California State Water Commission leaves the way open for the appointment of a man along the same lines as Mr. Chandler himself, a specialist in the field of water development and water law, or the appointment of another "business man," who, however worthy, must be dependent upon the advice of others for the basis of his decisions.

The principle of the appointment of an engineer to fill a position so frankly requiring an engineer's judgment cannot be too strongly advocated. The experience of the war commissions and administrators is striking proof of how successful the policy of utilizing experts may be and in most cases, how inadequate the non-expert.

The argument in favor of the appointment of laymen is, of course, that strict neutrality in judicial positions is best achieved by a man who approaches the question with no bias of prejudice through his knowledge of the subject and that a competent business man of a high moral character is the best type of commissioner in any field, however technical.

It is difficult to believe that knowledge on engineering subjects clouds the judgment on engineering matters and the refusal to appoint an expert on the ground that he was an expert would be as absurd as to bar all lawyers from judgeships because they had a knowledge of the law.

It cannot be too strongly pointed out, moreover, that the engineer is a business man, with as broad an experience and as comprehensive a citizenship as the corresponding group of men of commercial training. Other things being equal, that is to say with a big man under consideration in both cases, the man with an engineering background should be the logical appointee for the present position. It rests with the engineering profession to furnish a candidate of such calibre.

NEW JOURNAL SERVICE: The new affiliation of the Journal of Electricity opens up a wider possibility of service to the West and our readers should look for important improvements in these columns during the coming months. It *is* because the paper was good that we have been given this backing—under this new stimulus we now intend to become better. The Journal of Electricity will continue to be published in San Francisco and to represent Western industry. Our aspiration remains the same: "Devoted to the upbuilding of the electrical industry in the West."

An Electrically Driven Battleship

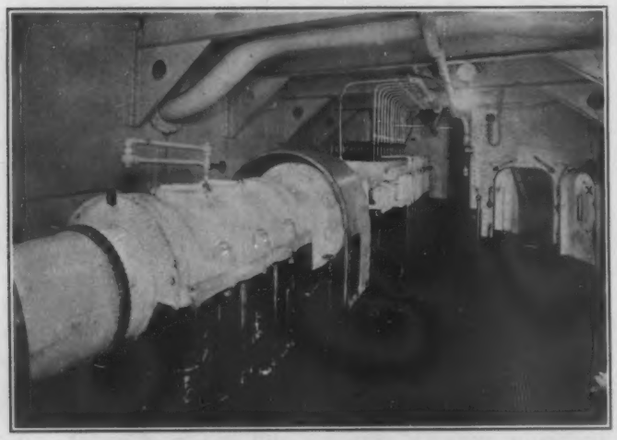
BY C. M. RIPLEY

(The arrival of the fleet on the Pacific Coast makes this account of the electrically driven battleship of particular interest at this time. The complete electrical equipment of the "New Mexico" and the proven advantages of electric drive are here described by one of the electrical engineers of the General Electric Company of Schenectady, N. Y., who was aboard the vessel on the occasion of her trial trip.—The Editor.)

Among the battleships of the United States Navy, none is of greater interest than the electrically driven New Mexico. This latest leviathan weighs 32,000 tons and requires 32,000 horsepower, or one horsepower per ton.

A Smokeless Fire Room —

Like everything else that is electrical, the New Mexico is the cleanest institution of her kind. There



After end starboard inboard shaft alley on board the U. S. S. New Mexico, showing thrust bearing

are no engines or turbines connected with the propeller shafts—only motors. There are no grates under the boilers—merely oil burners. There is not a coal or ash shovel on the ship; nor are there any cinders, smoke, dust, or soot.

The air in the fire-room is maintained at a higher pressure than the outside air, and with a greater proportion of oxygen. This increased pressure and increased oxygen are both useful in providing the proper combustion in the boiler.

There are seven openings in the front of each boiler and in each opening is an oil burner or nozzle at the end of a small pipe. The nozzle is a patented arrangement by which the oil is atomized by centrifugal force, although the nozzle is stationary. There are no air pipes supplying air to the boilers as the fireroom itself is one big air pipe. The air rushes in around the nozzle and while doing so it is given a rotating motion by stationary vanes which resemble the blades of a fan but which do not move. The atomized oil in the spray meets with this inrushing air, and the combination makes a perfect mixture which is practically smokeless.

Boilers —

There are three boiler rooms, each in a separate compartment, and each room contains three large boilers. Each of these nine boilers can deliver over 4000 horsepower and contains three miles of 2-in. seamless pipes. They deliver steam at a pressure of 250 lbs. per square inch.

Two Power Plants —

For propulsion there are two electric power plants in separate compartments.

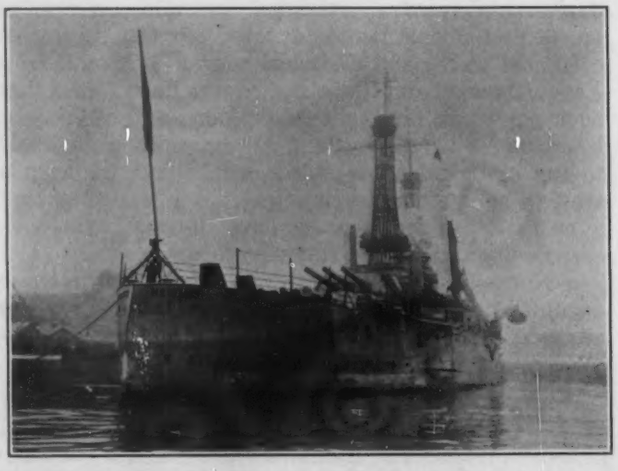
In two separate steel compartments 15 by 45 ft., are located the two turbine generator sets, each not over 27 ft. long.

The engine rooms of most ships of the past have been a tangle of bending and curving pipes. When one of these pipes burst, it practically meant the death of every man in the engine room. One of the advantages of these power plant rooms in the New Mexico is the fact that there is only one steam pipe in the room, and that is only 16 ft. long.

Electric fans in the power plant ventilate the room and also cool the generator, and the heated air is pumped outside.

Switchboards —

Eight copper wires convey the 16,000 hp. from the power plant room to the electric switches back of the switchboard. Here the ship is controlled upon receipt of instructions from the captain, sent either by loud speaking telephones, by indicators, by lights, or by messenger. Following these instructions, the engineers standing at the switchboard can start the vessel forward, or start it backwards; they can make it go at many different speeds in either direction; they can run all four of the motors from one of the power plants, or from the other power plant; they can even split up the load so that one power plant will run two of the motors forward and the other power plant will run the other two "astern." Another combination they can effect is that both power plants can equally share the load of driving the four motors—one to each propeller.



The U. S. S. New Mexico, the first electrically propelled battleship

If one of the propellers becomes foul, the engineer can disconnect this motor from the circuit, and then all of the power in the two power plants is available for the three remaining motors.

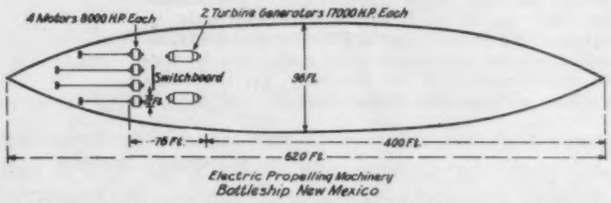


Diagram showing the location of the New Mexico's electrical machinery

Motor for Each Screw —

One motor is provided for each of the four propeller shafts. The screw is at one end of the shaft in the water, and the motor is at the other end of the shaft inside the ship. One reason for their efficiency is the fact that the shaft can be short as the motor can be close to the propeller. There is an additional advantage also, because the turbine generators can be located near the boilers, and this permits of a short steam pipe. These very desirable features are a result of electric drive, because it makes no difference what is located between the power plant and the motors, for the copper wires can be run in any direction, and around any obstacle. This is not the case with engine or turbine drive as they have long shafts.

No Reversing Turbines —

With electric drive, no reversing turbines are necessary, the reversing being done electrically. So with the electric drive, the turbines in the power plant always run in the same direction and can be more efficient for that reason.

Electrical propulsion not only does away with reversing turbines, but also does away with reduction gears. The wonderful simplicity of the arrangement can be appreciated also when you remember that the battleship Pennsylvania has ten turbines and the New Mexico only two.

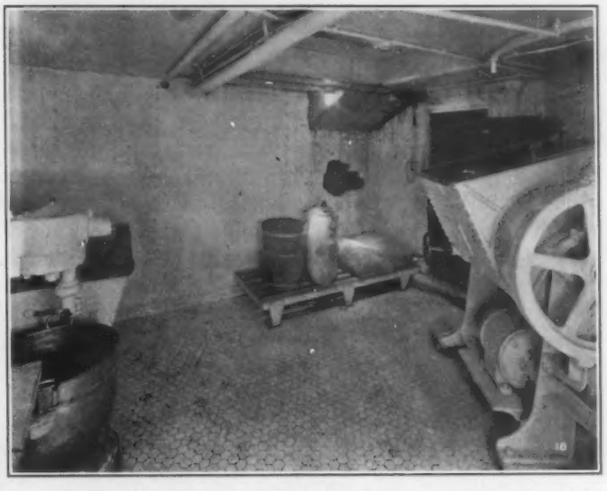
Propeller More Efficient —

Electric propulsion has another advantage in making the propeller more efficient. This is because, within limits, the faster a propeller turns, the less efficient it becomes. If it turns too rapidly, it merely churns the water, and therefore does not effectively drive the ship ahead. When turbines are directly connected to the propeller shaft, the turbine rotates too slowly to be at its best efficiency, and the propeller shaft rotates too rapidly to operate at its maximum efficiency. Electric propulsion permits the turbines to rotate at their normally high speed, where they show the best fuel economy, and also permits the propeller to operate at comparatively low speed, where it gives the best driving economy. Without electric propulsion, there were at many different speeds, practically "compromise" arrangements, by which either the turbine was rotating too slowly or the propeller too fast. This is obviated in the New Mexico, which is one reason why, with one filling of her oil tanks, she can cruise over 50 per cent further than with any other equipment. In fact, she can go 7500 knots at 12 knots speed before it will be necessary to take on any more fuel.

Electrical Equipment —

The New Mexico is practically the only 100 per cent electric boat. Her complete electrical equipment is as follows:

2	main generators	33,000 hp.
4	motors for propelling	33,000 hp.
6	dynamos	3,000 hp.
6	air compressors	400 hp.
2	vacuum pumps	80 hp.
20	motor generator sets totaling almost	100 hp.
4	boat crane motors	220 hp.
2	anchor motors	250 hp.
4	winch motors totaling	200 hp.
20	turret motors	1,300 hp.
10	ammunition hoists	500 hp.
2	refrigerator motors	40 hp.
8	motors in kitchen (Peel potatoes, mix dough and cake, and wash dishes, cut butter, make ice cream, meat grinder, all bread and cakes baked electrically.)	15 hp.
6	in carpenter shop	20 hp.
10	in machine shop	30 hp.
6	in laundry (5 machines use electric heat)	10 hp.
5	motors in print shop totaling	6 hp.
14	water pumps	150 hp.
4	oil pumps	8 hp.
50	electric air heaters	30 hp.
12	searchlights	300 hp.
160	fans, 60 blowers, 6 electric toasters, 1 electric percolator, 15 electric irons, 104 loud speaking telephones, 176 ship service telephones, 170 fire control telephones, 2 Sperry electric gyroscopic compasses, 7 portable electric drills, 2 electric glue pots, 6 electric soldering irons.	



View of the electric bakery on the New Mexico. There are eight electric G-E motors in the New Mexico's kitchen, electric irons, electric percolators and electric toasters. There is also a fully equipped electric laundry.

Particular attention is called to the loud speaking telephones, 104 in number, located all over the ship. From three different transmitting stations the bugle calls or other instructions can be sent to all or any one of five different groups of these telephones.

The navy has adopted this method as the standard ship propulsion for capital ships in our navy for the future.

Taking the Customer Into Partnership

(A movement which offers a peaceful solution of the problem of private or public ownership, which provides a ready answer to the continuous demands for capital required by a growing electric utility and which promises to act as a stabilizer in that important question of distribution of property, which is at the bottom of Bolshevism — is of vital importance not only to the electric power industry but to the nation at large. The Pacific Gas & Electric Company, of San Francisco, was the originator of the plan to sell stock to customers—and under the leadership of A. F. Hockenbeamer, second vice-president and treasurer of the company, carried out a most successful campaign, the details of which are here given.—The Editor.)

Selling stock directly to consumers instead of through the usual banking channels and without the insurance feature of an underwriting syndicate was in a broad sense an experiment when first tried by

Pacific Gas & Electric Co. Blaze New Financial Trail and Customers Become Partners to Eastern Amazement

AS CONSUMERS HERE BECOME GAS PARTNERS

Mercantile National Bank of San Francisco

Some of the unsolicited publicity which the Pacific Gas & Electric Company's plan evoked—a circular sent out by the Mercantile National Bank of San Francisco to its customers, and a commendatory newspaper article.

the Pacific Gas & Electric Company of San Francisco, in 1914, with no precedent anywhere that would afford any guidance. The advantages in public interest and good feeling which would result seemed obvious, but the Company hesitated to enter a field which might be misunderstood. Companies which sold their own stocks under the name of conveniently organized bond houses were well known—too well known, indeed, for a reputable concern to wish to be associated with them in the public mind. This was in 1914. Today the principle of "customer-ownership" is an established one throughout the United States, and forty million dollars worth of central station securities are held by some thirty-six thousand individuals, ninety per cent of whom had never owned utility stock. A. F. Hockenbeamer, second vice-president and treasurer of the Pacific Gas & Electric Company, may be said to have been the originator of the idea and himself personally conducted the first campaign.

California a Good Place for Experiment

California was a good place in which to try the first experiment. It ranks twelfth among the states in point of population but holds first place in per capita wealth. It is exceeded by only four states in the number of incomes over $3,000 per year and ranks second in the ratio of population to such incomes. It has for many years steadily accumulated a reserve for savings due to its great wealth and natural resources—gold, oil, timber, horticulture, agriculture, etc. These savings have to a considerable extent gone into securities and California has been known among bankers as an investing State for twenty-five or thirty years, as evidenced by the location in San Francisco of branches of big Eastern investment banking houses. California corporations generally sold their securities in the East in the first instance but experience of bankers is that they are gradually bought back by California investors, whose preference for our own securities is based largely on the fact that stocks and bonds of California corporations are exempt from State and local taxes.

The Undiscovered Field of the Small Investor

While the Pacific Gas & Electric Company was favored by the foregoing conditions in launching its novel and theretofore untried method of inviting its four or five hundred thousand customers to become partners in the business through the purchase of its first preferred 6% stock, it is unsafe to assume that there is not investment capital in reasonably prosperous and well established communities simply because they do not happen to be embraced in the itinerary of bond salesmen. The Government discovered this in its Liberty Loan campaigns. The Pacific Gas & Electric Company discovered it before the

Circulars issued by the Pacific Gas & Electric Company to notify their customers of the customer-ownership scheme

Government, but before the Pacific Gas & Electric Company discovered it, the fact was well known to sellers of gold bricks and fake securities who have drawn hundreds of millions of dollars out of the

pockets of small investors to whom legitimate investment opportunities were never presented in ways that they could understand or in amounts within their reach.

The Sales Campaign

In order to reach this group of non-stock-buying public, a comprehensive sales campaign was planned:

1st. Under date of June 1, 1914, a circular was issued to all officers and employes of the company. Distribution was effected through local offices and these offices also handled the subscriptions.

2nd. On July 24th a circular was sent out to all consumers. About 260,000 were mailed in sealed envelopes as first class matter. The circulars enclosed in envelopes were sent to the local offices where the addresses were placed upon them by means of the addressograph machines used in making out gas and electric bills.

3rd. On August 15, 1914, a second circular was sent to practically all consumers, but this time the distribution was effected in each district by means of collectors who delivered the circulars as they covered their routes in the performance of their ordinary duties. In some cases special messengers were employed. With this circular was enclosed a return post card giving the consumer an opportunity to indicate whether or not he had sufficient interest in the offering to justify sending someone to see him or to send him further information. Very few of the post cards were returned and this part of the plan was a failure.

4th. Just before mailing the post card to officers and employes a meeting was held in San Francisco attended by all heads of departments, district managers and all principal employes. At this meeting full information was given and everybody present encouraged to ask questions. A similar meeting was held at the time the first circular to consumers was mailed.

5th. Advertisements, which were changed from time to time, were inserted in the principal San Francisco papers and in practically all country papers in the districts served by the company. In this connection a good deal of excellent publicity was obtained in the news columns of these papers. This latter publicity was along legitimate lines as the plan was a novel one and naturally created a good deal of interest.

6th. The company managers and a good many employes solicited subscriptions. Outside of these a few men were sent out from the head office, not over five or six at any one time, who worked on a commission basis of $1.00 per share.

7th. In some of the smaller communities, and in several cities outside of the company's territory where they had no managers of their own, arrangements were made with local men, usually real estate and insurance brokers, to secure subscriptions on the basis of paying them $1.00 per share. These local men were supplied with printed cards to place in their windows and on their counters. Similar cards were also placed in offices of the company.

8th. At the head office a so-called "Stock Sales Department" was established.

9th. Regular brokers were encouraged to handle the stock and were paid $1.00 per share commission. The results were rather meager as the stock was not as a rule bought by brokers' clients, and after a few months the commission was withdrawn.

Two views of the checks for Dividend No. 19 on first preferred 6% stock ready for mailing to 6,350 stockholders

The foregoing explains fairly well the machinery of the campaign. Some general comment may, however, be of value.

The circulars to consumers, the newspaper advertising and the enthusiastic work of local managers and employes undoubtedly contributed to the success of the campaign more than anything else. The local agents and outside solicitors accomplished comparatively little directly but may have influenced some business to be brought to the head office for which they would not, in the nature of things, receive credit.

Cooperation With Banks

On the back of the first circular to consumers appeared a list of ninety-three banks, being the depositaries of the company in the cities and towns in which it operates, who, by special arrangement with the company, acted as agents for receiving subscriptions and payments. This proved to be quite a convenience to subscribers and also resulted in quite a number of subscriptions being received through the direct efforts of the banks. Having this long list of banks on the circular, furthermore, gave tone to the offering and undoubtedly helped to impress many people. With one exception no compensation was paid to the banks for their services, although they were allowed one-tenth of one per cent on all payments handled. The money was also permitted to remain with them on deposit until needed by the Company.

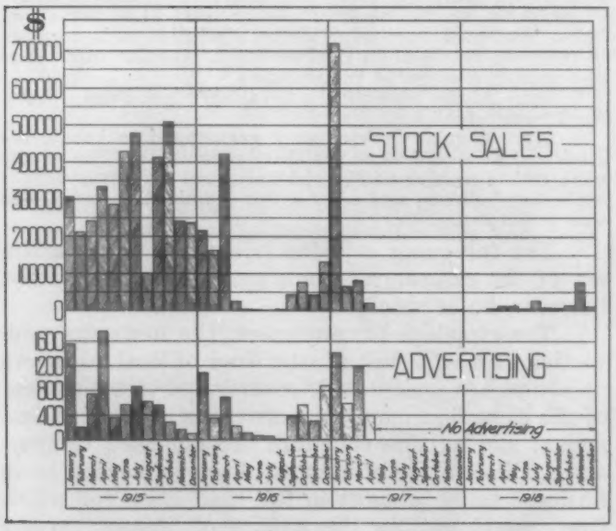
Satisfactory Results

On June 3, 1914, just prior to the inauguration of the company's stock selling campaign, the total number of stockholders was 2,898, with average holdings per stockholder of $14,530 par value. On December 31, 1918, the total number of stockholders was 8,242, with average holdings of $7,160.

As a result of the campaign, the number of holders increased approximately two hundred per cent. This shows a wide distribution of the holders. At December 31st, 1918, 5,130 or 62% were residents of California, and 2,288 or more than one-fourth were women.

One of the most interesting features of the campaign was that comparatively little of the stock was taken by people accustomed to investing in securities. One evidence of this was the large amount of checks received, drawn on savings banks, and by the large number of people who paid coin, much of which undoubtedly had been hidden away in stockings.

The remarkable feature of the campaign was the fact that such excellent results were obtained in spite of the financial depression which followed the beginning of the European war. Since the first in-



In this chart showing the relation between advertising and stock sales, it will be noticed that the sales fluctuate in accordance with the advertising, and that during the period of no advertising, the sales dropped astonishingly, being stimulated only by the automatic publicity involved in the payment of dividends.

tensive campaign, no drive for customer-purchasers has been directly made. Stock has been gladly sold on request and to some extent the dividends paid on the stocks already sold have acted as an advertisement, so that sales have been maintained even during the war period, but it is interesting to note from the appended chart how closely the extent of sales has followed the advertising campaigns.

Necessary Conditions for Customer Sales

The conclusions reached as a result of this experience in selling stock to customers are best expressed in the words of A. F. Hockenbeamer, second vice-president and treasurer of the company:

"My conclusion is that at least three conditions must obtain to make such an offering a success:

1st. "The security offered by the utility, whether it be stocks or bonds, must be safe and sound beyond question, as it would be suicidal to have anything go wrong with the investment after it has been widely distributed among the Company's customers.

2nd. The security must be of sufficiently small denominations to place it within the reach of people with moderate means, otherwise only a very limited distribution could be made and that would be among people who are already investors in the corporation stocks and bonds.

3rd. The yield on the investment must be relatively high, certainly better than a savings bank rate, and approximately what a good real estate mortgage, in which so many people of small means invest their savings, would return."

There is of course no definite way of estimating the intangible returns in good will, but there is no question but that the success of the campaign has added to the already high standing of the utility in the community.

Other Companies Try the Plan

The following is a list of the larger companies in the United States who have adopted the plan of selling securities directly to employes and customers, with approximate results to December 31st, 1918.

The tabulation accounts for about $26,000,000 worth of securities. According to the report of the Committee on Sale of Company Securities to Customers and Resident Citizens presented before the recent convention of the National Electric Light Association, slightly over $40,000,000 worth of central station securities, representing the issues of forty-eight companies, have been marketed locally—a remarkable record and a bulwark of good will in the communities represented.

COMPANIES WHO HAVE ADOPTED CUSTOMER-OWNERSHIP PLAN

Name of Company	Description of Securities	Date of beginning of Sales Campaign	Par value sold to Dec. 31,'18	No. of Sales	Average par value per Purchaser
Pacific Gas & Electric Co.	6% Pref.	7/14	$ 8,359,400	6,855	$1,219
Coast Counties Gas & Electric Co.	6% Pref.	1/1/18	19,200	46	417
Riverside Lt. Pwr. & Gas Co. (Kansas)	7% Pref.	1/1/15	600,000	350	1,714
Southern California Edison Co.	7% Comm.	7/27/17	3,670,400	2,404	1,527
H. M. BYLLESBY & COMPANY					
Arkansas Valley Ry. Light & Power Co.	7% Pref.	9/17	496,600	1,037	479
Northern States Power Co.	7% Pref.	6/15	4,029,800	8,023	502
Oklahoma Gas & Electric Co.	7% Pref.	7/17	191,200	557	343
Ottumwa Railway and Light Co.	7% Pref.	9/17	66,000	157	420
San Diego Consolidated Gas & Electric Co.	7% Pref.	5/16	621,500	367	1,693
Western States Gas & Electric Co.	7% Pref.	12/17	50,300	89	565
ELECTRIC BOND & SHARE COMPANY					
Utah Power & Light Co.	7% Pref.	7/22/27	369,700	841	439
Fort Worth Power & Light Co.	7% Pref.	11/19/17	104,200	123	847
Pacific Power & Light Co.	7% Pref.	12/1/17	155,800	386	404
Idaho Power Company	7% Pref.	1/21/18	60,300	175	344
Portland Gas and Coke Co.	7% Pref.	7/22/18	250,000	400	625
Nebraska Power Company	7% Pref.	8/30/18	262,200	441	594
Kansas Gas & Electric Co.	7% Pref.	11/25/18	15,800	61	259
Consolidated Gas, Electric Light & Power Co.	Common Stock	7/17/16	2,266,800	3,836	599
THE NORTH AMERICAN COMPANY					
Union Electric Light & Power Co.	7% Pref.	5/7/17	1,958,100	2,593	755
St. Louis County Gas Co.	5% Bonds	5/16	29,100	88	331
" " " " "	6½% Notes	12/18/18	7,100	17	418
Wisconsin Gas & Electric Co.	6½% Notes	8/5/18	300,000	598	502
" " " " "	7% Pref.	8/10/17	422,600	571	740
" " " " "	5% Bonds	11/27/16	92,800	225	412
Milwaukee Electric Railway & Light Co.	7% Notes	12/18/18	1,309,300	1,252	1,046
		Totals,	$25,708,200	31,492	$ 816

RECORD OF SALES

Sales of first preferred stock to employes, customers and other residents of the Company's territory have been made as follows since the Company's policy of local ownership was adopted in June, 1914:

Year	Number of Sales	Par Value of Stock Sold
1914 (June to December)	3,684	$2,405,200
1915	1,712	3,785,100
1916	617	1,123,100
1917	650	890,000
1918	192	156,000
Total	6,822	$8,359,400

Electricity in Local Products Week

BY CARL M. HEINTZ

(The various methods by which retailers keep in touch with local happenings were most effectively illustrated by electrical dealers of Los Angeles during "Home Products Week." Following is an account of one enterprising company's plan, by a member of the Los Angeles publicity department of the Westinghouse Electric & Manufacturing Company.—The Editor.)

This inviting display occupied one of the show windows of the Beacon Light Company of Los Angeles during the recent "Home Products Week" in that city. Light breakfast and lunch, electrically cooked were served here to the public throughout the week.

To stimulate the sale of locally manufactured products the city of Los Angeles recently staged a Home Products Week.

Practically all the merchants in Los Angeles, including the department stores, jewelry stores, etc., turned over the use of their show windows to the display of products manufactured locally. The electrical merchants took a very active lead in this work and a number of very attractive displays were installed.

The Beacon Light Company of Los Angeles, located in the heart of the shopping district, put on an extensive appliance campaign within their store.

One of their large show windows was arranged very attractively as a breakfast room, with locally manufactured rugs and winter furniture. A quantity of locally made food products was secured from the various manufacturers, and light breakfast and luncheon were served to the public during the Home Products Week. Advertising space was taken in the paper and they advertised locally manufactured products electrically cooked.

All the food was cooked on a small toaster stove using a turnover toaster for the toast and an electrical percolator for the coffee.

Breakfast, which was served up to 11 o'clock, consisted of cereal, of different varieties, with cream and sugar, buttered toast, coffee and cream, griddle cakes and syrup, and bacon. For lunch, sausage or fried ham was served with buttered toast and coffee,

and cake made of local products cooked in an electric range was served for dessert.

The demonstration in the show window attracted the attention of the shoppers and a number of housewives went into the store and were invited into the breakfast room where the different electrical

The exceptional window displays devised by local electrical retailers were a feature of Home Products Week in Los Angeles. This is one of the windows of the Beacon Light and Gas Appliance Company.

labor-saving devices were demonstrated. The demonstrator showed the housewife how easily breakfast could be served at the breakfast table without even entering the kitchen.

A number of labor saving appliances were sold, and a host of new customers brought into the store.

THE DEEPEST WELLS IN THE WORLD

Named in order of depth, the four deepest wells in the world are the Lake, 7,579 feet; the Goff, 7,386; a well at Czuchow, Germany, 7,348; and the Geary, 7,248. The two deepest wells in the world are therefore the Lake and the Goff. The R. A. Geary well, of the People's Gas Company, is about 4 miles northwest of McDonald, Pa., and about 20 miles south of Pittsburgh. The mouth of the well is about 1,050 feet above sea level. The Goff well was drilled by the Hope Natural Gas Company on the farm of M. O. Goff, about 8 miles northeast of Clarksburg, in northern West Virginia. Its mouth is 1,164 feet above sea level. The well begins 200 feet below the level of the Pittsburgh coal and penetrates the usual oil-bearing and gas-bearing sands, the lowest being the Bayard, which lies at a depth of 2,210 feet. The strata in the remainder of the well are alternately "lime" and "slate." The J. H. Lake well, of the Hope Natural Gas Company, is about 8 miles southeast of Fairmont, W. Va. It is about 20 miles north of the Goff well and about 60 miles south of the Geary well. The mouth of the well is about 1,300 feet above sea level.

Western Ideas

AN OBJECT LESSON in mail-order principles was contrived by a California electrical dealer as a means of keeping trade from going to mail order houses. When he started to sell a certain make of electric iron, he sent for a $5.50 mail order iron and, without even untying the string, set the package on the counter among the other irons. This is a specimen of the conversations which ensued when customers haggled over the prices of the standard irons:

"Why," asked one lady, "should I pay you $7.00 for an iron when I can send east and get a Stands Anywhere iron for $5.50?"

"Oh, you want the 'Stands Anywhere' iron, do you?" responded the dealer. "Well, I carry that, too. I'll be glad to sell it to you."

"Where is it? Let's have a look at it," answered the lady.

"It's right there in that box," said the dealer.

"Open it up. Let me see whether I want it or not."

"No," said the dealer. "It will stay in that box 'till it's sold. Isn't that exactly the way you buy from the mail order houses? Don't you pay your money before you ever open the box? I'll sell the iron to you on the same terms. That's fair, isn't it?"

The customer was convinced, and similar incidents have occurred many times. The box is still unopened, and the dealer has come to regard it as one of his most profitable investments.

A COMBINATION MAILING DEVICE which has many advantages is a small canvas bag with a strong brown paper envelope firmly attached to the closed end. Both envelope and bag bear the name of the company sending out the package, and the envelope has a space for affixing the parcel postage

A mailing device which combines a package and a letter and is a great convenience in ensuring their simultaneous arrival

as well as the usual right-hand-corner space for first class postage. The bag closes with a string at the top, and the envelope is sealed and addressed in the usual way.

For mailing small packages accompanied by a letter this device is a singularly happy thought. There are few people who have not been inconvenienced by the "under-separate-cover-we-are-mailing you" system. The letter with its encouraging promise arrives as first class mail, and is laid aside or filed against the time when the package shall put in an appearance. This may be the next day, but more often it is the next week. Then the letter has to be

disinterred and reunited with the package and the invoice. Frequently the package takes so long to follow the letter that an inquiry has to be sent out concerning it. Sometimes the package does not arrive at all — is lost on the way, or was never shipped. Where the package is not only mailed at the same time as the letter but is attached to it, as in the case of this combination device, matters are very much simplified for the recipient, as the affair only has to be handled once, the checking, filing and so forth being attended to all together and no further correspondence being necessary.

A SUCCESSFUL SELLING CAMPAIGN for sew motors, as carried out recently by a dealer, included several effective features.

The window display consisted of a sewing machine operated by a small boy. Cards were exhibited at intervals, some of them stating facts and figures about sew-motor economies and conveniences, others of a semi-humorous character emphasized the simplicity of operation by drawing attention to the obvious fact that a "mere man" could do it.

A section of the store was screened off and equipped as a sewing room. Here a capable woman operator was in charge, and housewives were invited to bring in their sewing to the demonstrator, and have it done the Sew Motor way. For those who could not come in, arrangements were made for displays in the home, and a special saleswoman with a good telephone voice was secured to take charge of this branch of the campaign.

A series of advertisements was designed, covering the whole week of the campaign and featuring the demonstrations.

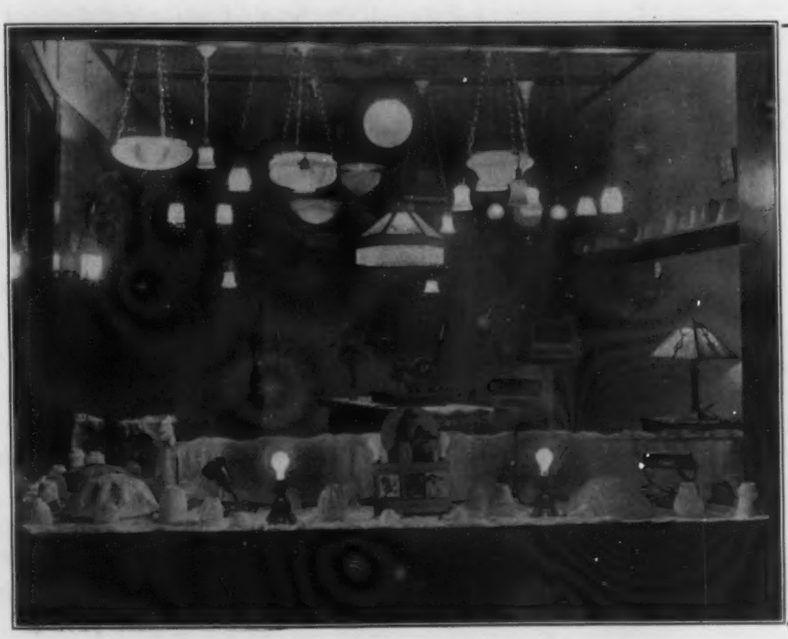
The result of these devices was most successful, and a surprisingly large number of sales were made.

A MINIATURE NEWS SHEET instead of the usual advertising matter is the device of one electrical dealer for drawing attention to his store. This news sheet is run in his advertising space in the local paper and is itself arranged to resemble a page of a newspaper. In it the dealer runs news items about the store; the people that work in it; the different new and old lines of electrical goods; interesting items about his customers and the people he wants as customers, and so forth. The current interest in an advertisement of this kind attracts attention and gives to a space which would otherwise contain merely a recurring advertisement, the status of a regular section of the paper to which people turn each evening for something new.

This form of advertising could be worked out from many new angles by the enterprising dealer. The personal element, of course, has greater possibilities in a small community, where everyone knows everyone else, but the news-sheet idea could be worked out in various other ways—as a series of timely cartoons, for instance, or chapters in a narrative. The great value of the notion, of course, is the fact that the same advertisement has a new interest every day and becomes, as it were, a "feature."

TIMELY ADVERTISING, when it depends on the weather, has to be prepared beforehand and held until wanted. The prompt umbrella and raincoat advertisements which appear in the newspapers almost simultaneously with the first shower are set up in advance by the newspaper and marked "Hold for Orders." When the rainy season arrives the order to publish is given, and the advertisements are inserted in the earliest possible edition.

This idea is almost exclusively employed by city stores, but there is no reason why it should not be adopted by small-town dealers, and applied to hot weather goods such as electric fans. Display cards and ideas for window arrangement should be held in readiness, and be promptly used to back up the newspaper advertising.



This attractive display corner is maintained by the Madera Electric Company of Madera, California. The general effect is that of a home interior showing the larger electric appliances, while in the foreground a careful, uncrowded arrangement of lamps and smaller appliances is enhanced by a judicious color scheme and good lighting.

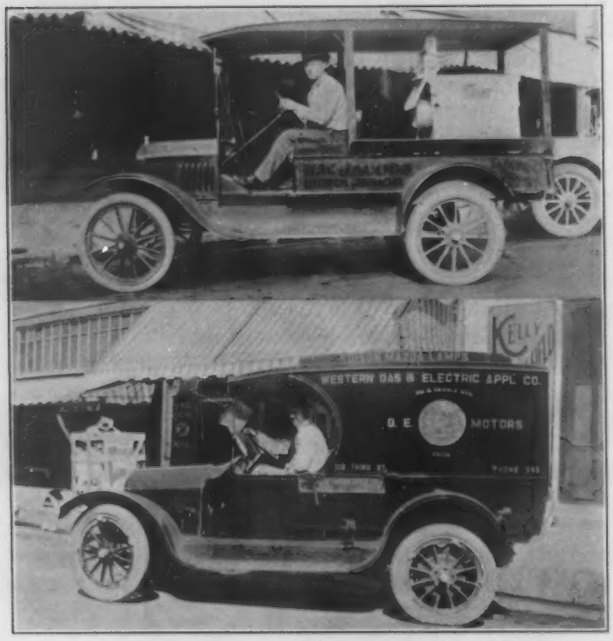
California Electrical Co-operative Campaign

(The work of the California Electrical Cooperative Campaign continues to present interesting new developments in the way of merchandising ideas and practical results among contractor-dealers. The following notes from workers and committees are illustrative of the activity of the movement.—The Editor.)

THE MODERN SANDWICH MAN

BY W. H. BRAINERD

In his delivery car the electrical dealer has an up-to-date "sandwich man." The car is always on the street and offers advertising possibilities that many dealers are quick to grasp.



The delivery wagon has great possibilities as an advertising medium, and successfully performs the function of the old-time sandwich man

Two good examples of this are shown in the accompanying pictures. The attractive car of the Western Gas & Electric Appliance Company constantly keeps its name before the people of Chico.

The body of H. W. Jacobs' car is painted a bright yellow and attracts considerable attention.

Mr. Jacobs also uses cloth banners on the sides of his car to tell the people of Santa Rosa of special offerings. Through the use of these banners he sold ten dozen irons in a very short time.

CONSIDERING THE CUSTOMER

The contractor and dealer in merchandising his electrical appliances must always keep in mind a selling fact that the sales manager of the department store or any other store catering to women's trade never forgets:

1. The sale is made to a woman, because the home and the articles that go into it come under her particular jurisdiction. The women are the ones whose interest, curiosity and desire for an article must be aroused by the merchant and to whom he must make the sale.

2. A man pays the bills, because the husband or father is the earning power of the family and holds the pocket book. He is the person whom the woman must talk into the purchase.

There are exceptions to this rule, but most women come within the general scope, and all have the same peculiarities in buying.

Masculine and Feminine Shopping Methods —

We point out this in the beginning because it states the dealer's merchandising problem and gives an insight into the difference in the shopping methods of a man and a woman. A man has the pocket book and usually goes direct to purchase what he wants and buys on the spot. The woman must go out shopping, look around thoroughly, see the article, know the price, and then go home to her husband with the arguments that will open his pocket book.

Suppose a woman has decided that she wants a coffee percolator: when she presents the subject to her husband he probably says:

"I have never found anything wrong with the coffee in the old coffee pot. It is good enough for me. I don't care what Mrs. Smith has. Your coffee has always been all right. That old coffee pot was good enough for my mother. You are never satisfied. You always want some new-fangled, expensive thing."

Suppose he does say that. Did you or your salesman give her any argument to combat that talk? Both of you could, because there are reasons why a percolator is better than the old-fashioned coffee pot and everybody should have one. You have an easier article to merchandise than a jeweler, because your articles are all useful.

A woman has more time for shopping than a man, who is usually busy during the hours a store is open, and as a result she looks around more. The fact that she is going to a certain store to purchase a certain article, does not keep her from looking at or inquiring about other articles that she will not purchase that day but may purchase later from that store or in other stores. A good merchant will make his sales force understand this. Salesmen and saleswomen are too prone to lose interest and patience or even become discourteous if they do not make a sale immediately. Many a prospective sale has been ruined by lack of interest on the part of the salesman, and many a prospective customer driven from the store forever by a discourteous remark, all because the salesman never thought about who pays the bill or had the foresight to look beyond that day's work. The whole subject comes down to this one point, that a woman comes to look before she buys.

The People Who Know —

In this connection, there is no more valuable acquaintance for a contractor-dealer to cultivate than the sales manager in a big department or furniture store. He is confronted with the same merchandising problem as you, and has spent more money, time and labor in catering to women shoppers whose husbands pay the bills.

There is no better person with whom to talk over the sales problem than your wife or mother; they are women and know the shopping problem. You can do no better piece of salesmanship than see that your home is equipped with the electrical conveniences you sell. Your wife is in a position to demonstrate them to her friends, who, once convinced of their value, will talk about your up-to-date home. News travels fast and women are interested in what other women have. You can make your home a salesman. By use you give notice to all that you have faith in what you sell. You have a talking point—"My wife uses this article and says—."

All is part of the game of interesting the woman who buys and opening the pocket book of the man who pays. If you will always remember those two and their relation to each other you can handle your customers intelligently and have the basis for the successful solution of your business problems.

NOTES FROM THE ADVISORY COMMITTEE REPORT

Contractors and Dealers Association Activity

Thirty-five new members were secured in the northern section for the State Association of Contractors and Dealers. The membership in San Francisco was increased 100 per cent; no reports are available from the southern section. This means that more than one-half of the contractors and dealers are now active in their association work as opposed to less than one-fourth when the California Electrical Cooperative Campaign opened.

Cooperative Old House Wiring Campaign

In Los Angeles a cooperative old house wiring campaign conducted by the Los Angeles Gas & Electric Corporation, the Bureau of Power & Light and the dealers and contractors of that city, resulted in the wiring of 200 old houses.

Development of the Contractors and Dealers

Each month finds the contractors and dealers more willing to take suggestions from the Advisory Committee through its field representatives, and quicker to act on these suggestions. While there is still room for great improvement, the Advisory Committee feels that it will come faster than in the past. Every contractor and dealer who has moved into a new location or rearranged his store and windows has found a marked increase in the sale of appliances which has more than offset his additional expense.

In Fresno every dealer has moved to a new location or completely remodeled his store, and all compare favorably with the best merchandising stores in that city.

MERCHANDISING METHODS

Determining factors in merchandising are listed as follows by a Cooperative Campaign worker:

1. **To get the customer into the store—**
   - (1) Location
   - (2) Solicitation
   - (3) Window displays
   - (4) Newspaper advertising
   - (5) Mailing lists
   - (6) Distribution of literature
   - (7) Store displays
2. **To make the customer buy—**
   - (1) Arrangement of store
   - (2) Display
   - (3) Cosy corner
   - (4) Telling the customer what he wants to know
   - (5) Courtesy to customer
3. **To have him come again—**
   - (1) Mailing list
   - (2) Literature
   - (3) Follow up

Scene in a commissary in one of the camps on the new Kerckhoff power project of the San Joaquin Light & Power Corporation, showing the attention that is being given to the welfare and comfort of the men. In the corner may be seen a Magnavox which produces the latest musical melodies for the delight of the workmen at their labors on the surrounding hills. The California State Accident Commission and the Commission for Housing and Immigration have made official inspections of the numerous camps on this project and both bodies are united in their reports that the camps are ideal in every respect and none finer are maintained anywhere.

Tree Telephony and Telegraphy

(Among the many interesting developments which have arisen in connection with radio telegraphy during the war period, the use of tree-antennae is one of the most remarkable. The following brief account is extracted from a paper by Major-General George O. Squier, Chief Signal Officer, United States Army. The paper was recently printed in the Journal of the Franklin Institute.—The Editor.)

In 1904 some experiments were conducted with a view to utilizing growing trees as antennæ for radio telegraphy and proved, in a general way, the efficacy of using a direct metallic contact to certain trees (principally eucalyptus) to increase the audibility of radio signals.

Following is a quotation from the account of these experiments:

"It would seem that living vegetation may play a more important part in electrical phenomena than has been generally supposed. We have seen that living vegetable organisms absorb and conduct electromagnetic oscillations over a wide range of the electromagnetic spectrum, beginning with sunlight, whose electrical action in the plant cell is at present little understood, and extending to waves of identical character, but of immensely greater lengths, such as Hertzian radiation, telephonic waves, and oscillations of the ordinary low frequencies used in commercial electric transmission lines. Disruptive discharges between vegetable electrodes, and electrostatic effects between vegetable surfaces are easily produced."

War-Time Developments —

In connection with the organization and development of transatlantic radio reception which was carried out during the period of the war to provide against the possibility of the interruption of the submarine cable system, the Signal Corps established a chain of special receiving stations in different parts of the United States to copy and record enemy and allied radio messages from European stations for the information of our Army General Staff.

In the prosecution of this work, directions were given to test the efficiency of growing trees as receiving antennæ in connection with this service, using the vastly superior technique and facilities now represented in the radio art as compared with the crude apparatus with which the discovery was made in 1904.

It was immediately discovered that with the sensitive amplifiers now in use it was possible to receive signals from the principal European stations by simply laying a small wire netting on the ground beneath the tree and connecting an insulated wire to a nail driven in the tree well within the outline of the tree top.

One of the best receiving arrangements is found to be an elevated tree earth-terminal in the upper part of the tree top, and an earth consisting practically of several short pieces of insulated wire sealed at the outer ends radiating out from a common center, and buried a few inches beneath the surface of the ground in the neighborhood of the tree.

It was soon found that a tree-antenna could be used efficiently as a multiple receiving set over widely different wave lengths, receiving either from separate terminals at the same or different heights of the tree or in series from the same terminal.

This same type of circuit was employed in an inverse manner for telephonic transmitting purposes, and although the experiments thus far have been limited to short distances, it was found that 2-way telephonic communication was easily established with remarkably low values of transmitting antenna current.

The flexibility of this arrangement is very striking. The linking up of wire and wireless methods was found to be convenient and efficient. Radio telephonic messages from airplanes were readily received by the tree-antenna arrangement and transferred thence to the wire system of the City of Washington and finally received at any point desired.

Furthermore, telephonic transmission through the tree-antenna was received by another tree-antenna, and automatically returned to the sender on a wire system, thus making the complete circuit. Long distance reception on any wave length from all the larger European stations and from ships at sea was easily accomplished and traffic copied on a twenty-four-hour schedule by the regular enlisted operators of the Signal Corps.

Data on the electrical constants of tree-antennæ have been obtained by Captain F. E. Pernot, Signal Corps, in charge of the Signal Corps radio research laboratory at the Bureau of Standards.

Potential Earth-Terminal —

We may regard the metallic electrode rigidly driven into the living organisms of a tree as a potential earth-terminal for the study of the potential distribution on the surface of the earth itself. This metallic terminal intimately connected to the earth itself and a part thereof, is subject to changes of potential representing the innumerable frequencies required by modern radio telephony and telegraphy as well as other disturbances which may occur on the surface of the earth or in the atmosphere.

We can select from this composite one or more of the different frequencies by tuned electrical loop circuits suitably connected to this electrode and study each in turn at will, just as color screens can select a particular component of white light. We may, indeed, by means of a highly insulated conductor bring this terminal directly to the laboratory and connect it immediately to the modern thermionic tube and amplify almost at will the particular effects we are studying.

The physicist and engineer, accustomed to deal with inanimate material, is here confronted with the employment of living vegetable organisms of growing trees. We may consider that trees have been pieces of electrical apparatus from their beginning and their manifold chains of living cells are absorbers, conductors, and radiators of the long electromagnetic waves as used in the radio art. For our present purposes we may consider, therefore, a growing tree as a highly organized piece of living earth to be used in the same manner as we now use the earth as a universal conductor for telephony and telegraphy.

The Nisqually Substation at Tacoma, Washington

(Some of the operating kinks which solve local difficulties, as they have been worked out in the Nisqually substation which supplies the city of Tacoma, Wash. The system is city operated, private companies being permitted to serve only large power installations. The following description of equipment and conditions gives a good idea of the operation of this interesting station. —The Editor.)

The supply of electric energy for the city of Tacoma, Washington, is unusually well provided for by the Nisqually Substation of the Department of Light and Water of that city. The station was designed to transform and distribute a capacity of 20,000 kilowatts. Three-phase, 60-cycle power is received over two transmission lines from the hydro-electric station at Legrande, 36 miles distant, at 50,000 volts.

A tap is taken off the high tension line to supply Camp Lewis and also the pumping station for the city water supply. Current is distributed at 2300 volts, 4000-volts-Y, to the city for light and power. By agreement with the city, the private company operating therein is not allowed to furnish any light, or any power in units under 25 horsepower, within the city limits.

Increasing the Load

Though the station was originally designed for a capacity of 20,000 kilowatts, it usually carries a load of 24,000 kilowatts or over. The station is under the direction of F. S. Morrison, chief operator, who has under him one operator and an assistant for each of the three eight-hour shifts.

For regulating the voltage of the light and power feeders, there are installed 21 69-kva. single-phase Westinghouse automatic feeder regulators.

Switchboard Equipment

The switchboards for the control of the incoming lines, outgoing feeders, arc circuits, and auxiliaries in the station, are built in sections, and mounted separately.

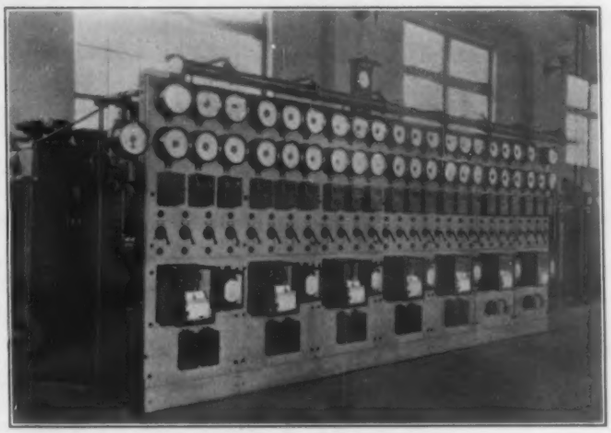
2—3 60,000 volt, 300 amperes, Westinghouse oil circuit breakers on incoming lines, showing transformers in background. City of Tacoma, Nisqually Substation.

The boards are of blue Vermont marble surmounted by cornice work and are equipped with the usual complement of switching and measuring devices, making altogether a most attractive looking installation. Each outgoing feeder circuit is equipped with a graphic recording meter.

The switchboards, together with the lightning arresters, and oil circuit breakers on the high tension lines, transformer banks and feeder circuits, were furnished by the Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.

Standby Current —

Standby current for the operation of the remote-controlled circuit breakers and the pilot lamps is furnished by a storage battery which floats on the line continuously. It contains 65 cells and is of the E-"11" type, supplied by the Electric Storage Battery Company.



Nisqually 7-panel Westinghouse switchboard installed, City of Tacoma, Washington, Nisqually Substation. The regulator just behind the switchboard is one of a bank of 21 Westinghouse 69-kva., single-phase, 60-cycle, 2300-volt, 10-20 per cent regulators, on light and power feeders.

Current for normal operation and for charging the battery is supplied by a motor-generator installed in the basement. The battery is kept floating on the line continuously, that is, it is never discharged except in an emergency, and charged just enough to equalize the cells once every two weeks; at other times the motor-generator carries the load and the battery floats.

The floating voltage of the battery is from 2.10 to 2.14 volts per cell, and in order to protect the graphic meters and pilot lamps, it was necessary to insert a resistance. The resistance originally used was a grid with a standard rheostat head which protected the devices, but did not allow enough current to pass to operate the oil circuit-breakers. In order to overcome this difficulty, counter cells were installed, some of which were built up out of old battery elements. These cells reduce the voltage, but at the same time permit a sufficient flow of current to operate the breakers. There are 12 counter cells divided into three groups of four each, with taps taken off so as to permit the cutting in or out of one or more groups as may be desired, and they are so connected that the current passes through them from positive to negative, continuously charging them.

Operating Features —

The operation of the graphic meters and pilot and pilot lamps requires a continuous flow of about seven amperes through the counter cells, which causes a rapid evaporation of the water as well as the deterioration of positive plates. To overcome this, Superintendent Morrison has adopted the following scheme which has worked out most successfully: A 6.6-ampere series burning incandescent lamps is connected across each group of four cells. This shunts six amperes away from the cells, reducing the current flowing therein to from ½ to ¾ of an ampere, and at the same time affords the benefit of the illumination given by the lamps which are located at certain points where it is needed. These locations are vital points, and in the event of the power going off at night, the illumination will be of the greatest assistance to the station operator.

In operating one of the circuit-breakers, the current momentarily reaches a value of seven amperes, thus subjecting the lamps to an over-rush of current. In order to correct this, Mr. Morrison expects to add three more cells, making a total of 15, divide them into three groups of five each, and install a short piece of resistance wire in series with each lamp so as to hold down the current to six amperes. A snap switch is installed on each lamp so that when the battery is getting its equalizing charge, the lamp can be cut out, causing the counter cells to build up to their highest voltage at the time when it is most needed.

5 4,000-volt, 600-ampere, 4-pole, Westinghouse oil circuit breakers on light and power lines in foreground, and 2 type 16,500-volt, 600-ampere, 4-pole, oil circuit breakers in background.

Mechanical Department of a Modern Bank

BY F. E. CHURCH

(The average depositor does not connect electricity with banking, but this glimpse behind the scenes of a modern bank will give some idea of the equipment necessary to maintain the smoothly-running machine with which we are all so familiar. The article, which is reprinted from the "Coast Banker," is by the chief engineer of the Guaranty Trust & Savings Bank of Los Angeles.—The Editor.)

The average patron of large banking institutions and, in fact, the employes themselves, do not generally understand the relationship and the importance of the mechanical and maintenance departments to their comfort and convenience, as well as the efficiency of the bank's service. The abundance of cool, fresh air that greets the patron as he comes in off the street and invigorates employes during the hot, sultry summer months, is taken just as a matter of course. Ice cold water from sanitary drinking fountains, rapid elevator service from basement to mezzanine, the pneumatic tube carrier system which rushes checks and items for O. K.'s from one end of the bank to the other and back in a twinkling, the bright, polished marble and brass and gilded trimmings, the fresh, clean blotters and check pads on the writing desks, and the general spic-and-span appearance of everything about the premises, all go to make up the subconscious impression which any patron is bound to have of "his bank"; but how many ever stop to think of the planning and equipment and labor that it takes to make all this possible, and to make sure that the subconscious impression is a good impression?

The relay system for the pneumatic tube carrier system. Tubes connect all departments, enabling papers to be sent from one department to another at the rate of fifty feet a second.

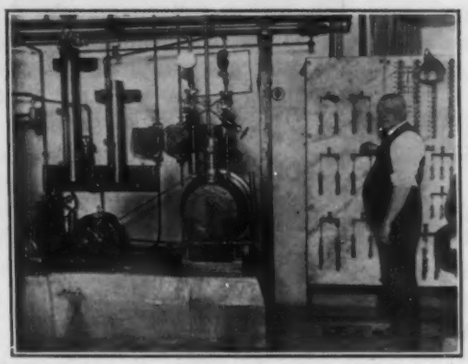
The management of the Guaranty Trust and Savings Bank gave a great deal of attention to these matters, and in building their banking quarters engaged the best architects and designers, that every facility might be provided to insure the utmost comfort for employes and patrons alike, and to give the most efficient service possible.

A Modern Air Laundry

Perhaps the most important item affecting the health and comfort of employes is pure air. To provide this, a very elaborate heating and ventilating system is installed. Pure air is drawn down a large shaft from above the dust and dirt of the street, at the rate of 40,000 cubic feet a minute. At the bottom of the shaft, the air passes through a close mesh screen over which water is constantly flowing, the effect being to thoroughly wash out any impurities the air may contain. A six-foot fan, driven by a 15 horsepower motor, forces the air through the plenum or distributing chamber, which has three

compartments—the cold air, hot room, and the heating element.

From the plenum chamber there radiate square ducts, of varying sizes for equal distribution of air, to all parts of the bank premises. Each duct is provided with dampers, one opening into the hot and the other into the cold air chamber. These dampers are



This two-ton capacity ice-making machine supplies fresh cold water at sanitary drinking fountains throughout the bank

connected to a thermostatic regulating system which operates to maintain any desired temperature in any part of the bank. The heating element of the plenum chamber contains steam coils with an area of 3000 square feet of heating surface. In the summer time these heating coils are filled with cold water to collect the humidity and cool the air.

But the job is not all done with pumping in an abundance of good air; so means are provided to remove the old air. A system of tunnels lies beneath the basement floor, with openings through registers into various parts of the bank. Through these registers and tunnels, a 15 horsepower Sturtevant fan exhausts the air from the banking quarters at the rate of 38,000 feet per minute. This remarkable "air laundry" provides a complete change of atmosphere within the bank every six minutes!

Running Ice-Water

Next to fresh air, in importance to health and comfort, comes pure, cool drinking water. This very essential element is supplied at convenient places throughout the bank in sanitary drinking fountains. The water comes through large filters in the basement of the building, and thence into insulated tanks in the bank's machinery room, where it is cooled by means of coils attached to a two-ton capacity ice machine, motor driven. A small triplex pump forces the cool water to the fountains.

Keeping Up Rapid Service

In a large departmental bank, with departments widely separated and on different floors, and having numerous transactions with one another, it is necessary for the best of service, to provide a means of rapid transmission of documents and checks to all parts of the bank. That the best possible service might be maintained, the Guaranty installed at great expense a pneumatic carrier system with twenty stations in the different departments, all connected through a central station at which an operator is on duty. Thus communication between departments is carried on with the least possible delay.

The pneumatic system is operated by a suction blower, motor driven, having a capacity of ten cubic feet of air per revolution, and so arranged that the speed of the suction blower is governed by the number of tube stations in operation simultaneously.

Bank Elevators

Three elevators of the hydraulic plunger type come under the equipment and care of the mechanical department of the Guaranty Trust and Savings Bank. The passenger elevator operating between the safe deposit department in the basement, the general banking room on the main floor and the trust department on the mazzanine floor, is a most important part of the equipment from the standpoint of modern, efficient bank service. The proper attention to old and feeble patrons of a bank, and the growing tendency of all to demand a service in which everything is done for them, makes an elevator an almost indispensable part of up-to-date bank equipment.

The second elevator is called the coin lift, and is used to carry the "money busses" used by the tellers in the cages, to the coin vault in the basement and back. The third is for the use of the loan department to carry the large trucks containing mortgage papers to and from the vaults in the basement.

The elevators are operated by an automatically governed triplex pump, connected to two tanks. One is called the pressure tank, and from it the water is supplied to the elevators at a pressure of 125 pounds per square inch. The other is the "surge tank," and receives the water that is discharged from the elevator cylinders.

The flash messenger call system, the operation of the vault-door platforms and the intricate time-lock and burglar alarm protection to the vaults, and the maintenance of an elaborate indirect lighting system, as well as the proper upkeep of all furnishings and fixtures representing an investment of about $400,000, all come under the responsibilities allotted to the mechanical department of the bank.

Safeguarding Waste-Paper

Even the waste-paper, which generally disappears into the waste-paper basket in most lines of business, receives a degree of attention at the Guaranty that would do justice to matters ordinarily considered of greater importance. The waste-paper from each department is put into a separate sack every night, and all the various sacks of waste-paper collected for the day are put into a steel bin. There are thirty such bins in a fire-proof room, and the waste-paper is thus stored for thirty days.

By thus sorting and storing the paper, any lost checks or other important papers may be easily traced. And at the end of the allotted thirty days, the paper is burned in an incinerator in the basement of the bank, so that no papers which may contain information of a confidential nature can inadvertently get outside the bank and fall into strangers' hands with possible damage to patrons or the bank.

A telo-autograph system is also part of the equipment installed for better service in the bank. By means of this mechanism, a teller, without leaving his window, can transmit to his bookkeeper any desired question about a patron's account, and have an answer back immediately; the whole operation being possible without the knowledge of the patron standing at the window, and thus avoiding possible embarrassment to him.

To cut down unnecessary noises, two sound-proof rooms were constructed to house the power check-canceling machines. In this way the canceling of thousands of checks, a very noisy operation, is carried on rapidly and quietly.

The employes of the Guaranty Bank are encouraged to make suggestions of improvements in equipment or methods of operation that will tend to expedite their work. These recommendations often involve changes in the equipment of a mechanical nature and are therefore turned over to the mechanical department to be worked out and installed.

The multitude of little things that can not be checked up or noted, that fall among the duties of the mechanical department of an institution with such elaborate and intricate equipment as that of an up-to-date departmental bank, requires machinery and personnel of an extent little guessed by the average bank patron.

How Prices Sell Goods

BY J. E. BULLARD

(The general psychology of price setting is here discussed in its relation to the type of business sought by the retailer. The effect of cut-prices upon the attitude of the customer, the need for convincing advertising to explain sale prices, and the varying methods of department stores and specialty stores are among the points taken up.—The Editor.)

As the result of a wager a man stood on the corner of a busy city street endeavoring to sell five-dollar gold pieces for one dollar. Even though he used every sales effort of which he was capable the day's sales was not great. The price was too low. People could not believe that any sane man would sell perfectly good five-dollar gold pieces for four dollars less than they were worth. Let your prices, or any business proposition you have to offer lack plausibility and you fail to make money.

Central Stations and the Sale of Appliances —

There was a time when many central station managers believed that a great many more electrical appliances could be sold, and that a very considerable increase in the consumption of electricity would result from selling appliances at cost price, or even less. There are probably a few central station managers who still hold this view. As a result of this idea central stations at one time, in certain sections of the country, sold electric flat irons for $3.75 when dealers found it necessary to charge $5.00 for the same iron. Even under such adverse conditions some dealers had the temerity to stock a few electric irons. People who compared the prices of the dealer with those of the central station could not understand why there should be such a difference. When the central station salesman explained that the company selling the electricity could afford to sell the irons for cost or less, the only plausible explanation was that the electric rates were so high as to result in an abnormally high profit to the comnpay, and that the irons were sold so cheaply not to render real service to the public but to mulct them of a few more dollars.

When any public utility begins to sell appliances at a greatly reduced price, it is starting trouble for itself and for all others connected with the electrical industry—unless it can make the proposition seem perfectly plausible to the public. This it is rarely, if ever, possible to do, with the result that excessively low prices for appliances do not over any great period of time secure the expected results.

The Department Store —

Possibly no other class of business men have given more thought to the problem of making prices sell goods than have department store men. It will be noted that all department store prices seem plausible. If the goods have a standard value of one dollar they are priced at 98 cents. It appears reasonable that a large store with great purchasing powers could sell dollar goods at a discount of two cents, and as two cents on every dollar is well worth saving, people swarm to the department store.

If a sale is made at a very great reduction in price it will be discovered that the advertising done for the sale gives a very plausible explanation of the low price. Perhaps a large stock of these goods has been purchased from some bankrupt concern. Perhaps it is the end of the season and the stock cannot be carried over to the next season on account of style or some other changes. In any case the explanation will be one that will satisfy the customers.

Exclusive Prices —

These are very important features to observe in setting prices on goods to be sold, and in the advertising of these goods. First of all, the prices must seem plausible. In certain lines of business there are specialty shops where admittedly high prices are charged. These are explained by the fact that high prices make better service possible, and the distinction attracts a certain class of trade even though the goods sold are of no better quality than similar goods sold at much less cost at department stores.

The dealer so situated that he can attract sufficient business from the very wealthy can combine with his business some sort of engineering service of a residence or domestic nature, and increase his prices far beyond those charged to the average trade. To do this, however, and make a real success of his venture, he will have to adopt many of the features

of the specialty shop, combine with it some special feature and not endeavor to secure any of the middle class business.

Cutting Prices —

Never place prices below the real value of the goods sold unless the most plausible reason can be given for doing so. The goods will be cheapened in the opinion of the customers and business will be lost rather than gained.

The safest plan to follow in regard to making prices help sell goods, is to sell them at the prices advertised by the manufacturers. If no prices are advertised, first be sure that the selling price fixed covers the cost of doing business. It is not well to pay too much attention to the prices charged by competitors. If you try to meet your competitors on prices, sooner or later you start a price-cutting war and in the end every one loses. Any great cut in prices, as has already been shown, rarely results in greatly increased sales. Unless the prices allow a reasonable margin of profit the business is doomed to failure.

If a dealer feels that the class of business to which he is catering requires a cut in prices, let those cuts be in odd cents and small rather than great. As a general rule all dealers will find that standard prices will sell more goods than cut prices. The least cut, in spite of everything that may go with it, never fails to create an atmosphere of cheapness and lack of quality.

A TELEPHONE EXCHANGE BY PARCEL POST

(Shipping a building through the mail is one way of constructing a telephone exchange where no railways go. This interesting little account is extracted from an article in a recent number of the Western Electric News, to which publication acknowledgments are also due for the cuts used as illustrations.—The Editor.)

Roosevelt, Utah, is a town whose population numbers some 900 people, and is located in the Uintah Valley, surrounded by the towering peaks of the Rockies, isolated from all surrounding civilization by cliffs, hills and bad lands that the railroad has not been able to penetrate. To get to it you take the train to Price and then get aboard the stage coach and travel 125 miles to Roosevelt. On that trip you go through mountain passes, swing perilously close to mountain ledges, slough through alkali-covered bad lands, and ford mountain streams whose waters threaten to carry coach, horses and passengers along with them. This is the way everything, including the mail, has to go to Roosevelt.

One of the transportation difficulties experienced in conveying material for the telephone exchange over the mountain trails to Roosevelt

The telephone wire, that thin thread in the modern web of civilization, has penetrated into the mountain fastness of Roosevelt—where even the railroad has not dared to tread.

The remains of a parcel post truck struck by lightning while on its way to Roosevelt to deliver equipment for the telephone exchange

In constructing its telephone exchange to Roosevelt, the Uintah Valley Telephone Company had to devise some way to get the material in—and chose parcel post. And so it happened that an entire telephone building, brick by brick, was shipped through the mail. The building is 25 by 32 feet and contains nearly 15,000 bricks. Each brick was wrapped in a piece of paper and ten bricks were packed in a crate. The postage amounted to $825 or about 5½ cents a brick.

The telephone equipment left the Salt Lake office piecemeal, every bit of it parcel post. It is no uncommon thing to see on the Salt Lake shipping floor a number of crossarms, bearing postage stamps and the Roosevelt address. Desk stands, wire, insulators, etc., all go the way of the overland stage and parcel post.

The Uintah Telephone Company has over 500 miles of telephone lines, covering the entire Uintah Indian Reservation and continuing down through the state to the old "Cliff Dwellers" lands.

The transportation problem is a complex one due to road and climatic conditions. Automobiles, prairie wagons, sleds, and vehicular contrivances, so original no name can be found for them, come in for their share of the road work. In winter the snow and terrific cold make maintenance work a real job—in summer the severe electrical storms play havoc with the lines.

But in spite of the obstacles this little town in the fastness of the Rockies, so far from the beaten paths of civilization, has a telephone exchange and telephone equipment as modern and up-to-date as that of any city.

Water Power Rights on Government Land

BY W. B. HEROY

(The classification of lands in their relation to water power, and the various aspects of water-power development on government land are dealt with here in the second of a series of articles on water-power rights. The subject is of special interest at this time to the Northwest where large tracts of land are about to be thrown open to the public for various purposes. The author has been connected with the Land Classification Board, and the article is published by permission of the Director of the U. S. Geological Survey.—The Editor.)

The influence which the United States may exercise over the development of water power rests on its constitutional authority to control navigation, and on its ownership of public lands. Whereas the supervision of water-power development on navigable streams is usually recognized as being merely incidental to the improvement of navigation, the authority which may be exercised over the public lands is absolute, and the power regulating water-power development where public lands are affected is correspondingly great.

That particular tracts of public lands might have value for water power has long been recognized, for the early surveyors of the public lands were required to report all "mill seats" observed. The recognition of the fact that lands valuable in connection with power development should be removed from the ordinary course of disposition and specially administered, came, however, only after the realization of the special value of such lands consequent on the application of electricity as a means of power transmission. The first segregations within the public domain of lands valuable for power were made by Secretary Garfield. Under his direction the Reclamation Service selected certain power streams and recommended the withdrawal from disposition of bordering lands. Shortly after the beginning of the administration of Secretary Ballinger, he instructed the Geological Survey to "make investigation of water-power sites on the public domain, outside of national forests, which are not included in withdrawals for reclamation purposes, with the view to securing at the next session of Congress legislation to control and regulate their disposition."

Under these instructions the work of withdrawing lands valuable for power sites has continued up to the present time, subject, however, to the provisions of the act of June 25, 1910 (36 Stat., 847); Secs. 13 and 14 of the act of June 25, 1910 (36 Stat., 855); and the act of August 24, 1912, which give specific authority for withdrawals previously made under the general powers of supervision over the public lands vested in the Secretary of the Interior.

Selection of Power Sites

In carrying out these instructions the term "water-power site" has been interpreted to include any lands valuable in connection with power development. So rapidly has hydraulic engineering advanced that a diminishing proportion of the great hydro-electric plants of the United States are at points where nature has given unusual opportunities for power development by great concentration of fall. Natural water powers, water-falls and rapids, are generally the first to be utilized because the cost of construction is usually less per unit of power developed. After the water-falls in a region are harnessed, the demand for power makes profitable the development of less favorable sites. Then, as a last step, comes the creation of power sites on streams where, because of evenness of slope no marked opportunities for the development of power exist. Lands adjacent to such natural power sites as those at Snoqualmie Falls and at the Great Falls of Missouri are thus of great value, but it is no less true that lands along the Connecticut, the Tennessee, the Deschutes or the Colorado may have power value even though there may be no marked concentration of fall. The term "power site" is thus used in a broad rather than a restricted sense.

A water-power site, an opportunity for present or future power development, consists of two elements, flow and fall. The one element arises from the water itself, the other from the topography of the stream channel. Many rivers discharging large volumes of water are unsuited to water-power development because of the lack of slope. The Hudson below Albany and the Columbia below the Dalles are familiar examples. On the other hand, other streams have steep slopes and are topographically suited to the development of power but are deficient in quantity or distribution of discharge. The one element, flow, is a function of the water; the other, fall, is a function of the land over which the water flows. A power stream is thus one which by reason of the volume and regimen of its flow and of the slope and character of its valley affords opportunity for power development. The present feasibility of such development depends not only on these physical characteristics but also on economic conditions, such as cost of development and market. A water-power site is a particular portion of such a stream and its valley which is susceptible of development as a unit.

Where the gradient is steep, development may be of the high-head type, concentration of fall being effected by diversion of the water in a conduit. Where the gradient is gentle, dams are constructed to obtain the necessary head, the power house being placed at or near the dam, thus forming a low-head development. No clear line of demarcation can be drawn between these types and intermediate forms of development in great variety exist.

Determining Water-Power Value

The problem of determining what public lands have water-power value if the stream is suited to low-head development is relatively simple. The complete development of power in such places will depend primarily on the occurrence of suitable sites for the construction of dams of such height as to divide the stream into a succession of pools. A careful topographic survey of the stream and its immediate valley is first made. The hydraulic engineer using the topographic map as a basis, studies the

possible dam and power-house sites, the available data relative to the discharge and fluctuations of the stream, and the possibility of its improvement by storage reservoirs. A single scheme or alternative schemes of development are then worked out, providing for the greatest practicable ultimate utilization of the river, and the legal subdivisions of public lands which include areas necessary for flowage and power development works are withdrawn from disposition. Existing development works are taken into consideration in the formulation of such a comprehensive plan, and additional data are sometimes obtained from the surveys and water filing of power companies which own or control flowage rights.

Methods of Development

In the case of high-head developments, the problem increases in complexity, because of the variety of developments that become possible. Such a project will in general include a diversion dam, usually forming a small reservoir, a conduit conveying the water to a forebay reservoir, and pressure pipes conducting the water from the forebay to the power house. It is obvious that the location of structures of this character affords opportunity for wide variation, largely dependent perhaps on the ideas of the designing engineer. It is occasionally even difficult in preliminary studies of this kind to determine which side of a river affords the more economical conduit location, for the shortest line may be more than offset by difficulty of construction. There are, however, certain features which may serve to fix the limits of the section of a river to be included in one development. Thus the intake may be placed just below the mouth of an important tributary, not only to make use of the additional water it contributes but because a diversion at a higher point might necessitate carrying the water by flume or siphon across the tributary valley. Such a junction might also be the best site for a diversion dam, for flowage, and hence storage capacity, is obtained both on the main stream and the tributary. The portion of the stream to be included in one development depends largely on the slope and the length of conduits. The position of the power house is governed by such factors as the position of the intake of the next development downstream, by the length of pressure pipe required, and by the topography of the site itself.

Withdrawal of Public Lands

Until, therefore, actual construction is completed and the power of a high-head stream is harnessed it is seldom possible to state absolutely that certain tracts of land and those only will be utilized for power development. The alternative is to include in power withdrawals such lands as would be required for the location of structures under such other schemes as may appear feasible. Withdrawals of this type can scarcely be considered classifications in the sense in which the term is used with relation to agricultural and mineral lands, and as a rule no strict classification is possible. Under existing legislation however, this is the only means by which water-power sites of high-head type may be held in public ownership.

Withdrawals thus doubtless include lands that will never be actually utilized for power development. If, however, the withdrawals were made to include only one possible development and the lands necessary to other possible and perhaps equally feasible developments were allowed to pass into private ownership, the power site would have passed from federal control just as effectively as though all the lands had been restored.

Diversified Use of Land

This withdrawal of public lands as a safeguard against the alienation of the water power under existing law withholds the land from other forms of development. It is patent that a large portion of a forty-acre legal subdivision might be physically utilized for agriculture or mining without interference with a water-power conduit on the same tract. In other words, two uses of the same tract of land at the same time are possible. A parallel example is afforded where coal is mined under land at the same time that crops are raised on its surface. Such diversified use of the lands is to be encouraged as promoting the fullest possible development of our natural resources. In the situation which has arisen because of water-power withdrawals, it has been suggested that provision be made by act of Congress by which lands determined to have such power value may be patented with the reservation to the United States or its assigns of the exclusive right to use the land for power development, with payment to the patentee of actual damages incurred from such use. Such a reservation of water power rights would be similar to the reservation of the coal provided for in the act of June 22, 1910 (36 Stat., 583). Both the public lands water-power bills which were before the 64th Congress contained provisions of this character.

Classification of Public Domain

In accordance with the general principles above outlined about 1,800,000 acres have been drawn from the public domain because of water power value. The activities of the Survey have, however, not been confined to recommending withdrawals of lands valuable for power sites, but under the Secretary's instructions, large areas have been classified as without power value. Careful regional studies of the public-land States have been made and office maps have been prepared, or are in preparation, indicating areas within which no important power sites are known to exist. By the use of these maps the Geological Survey has reported to the General Land Office as without power value areas many times larger than the toal area of lands withdrawn for this purpose. The elimination of the lands without power value and the retention of the lands which have power value thus become in effect a water-power classification of the public domain.

DETECTING SHIPS IN A FOG

A new discovery by Marconi provides a means whereby a ship in the densest fog may become aware of the approach of another ship. The apparatus also gives an approximate idea of the distance of the approaching ship.

Operating Difficulties

(An especially important feature of the forthcoming Pacific Coast A. I. E. E. Convention at Los Angeles September 18-20 will be the presentation of a number of brief practical papers from power men under the classification, "Symposium of Operating Difficulties." Vigorous efforts are being made to obtain these records of actual experience from as many sources as possible in order that the symposium may be broad, impersonal, and of real practical aid to the engineering profession as a whole. Following are two typical papers.—The Editor.)

STOPPAGE AND LEAKS IN TRANSFORMER COILS

BY JULIAN ADAMS
Assistant Electrical Supt., Pacific Electric Ry. Co., Los Angeles

In the substations of the Pacific Electric Railway system the transformers vary in size from 100-kva. to 1000-kva. and a large percentage of them are water cooled. With these substations scattered over a wide area, all sorts of water conditions are encountered. In localities where a large amount of solid matter is held in solution a great deal of trouble has been experienced with the transformer water coils becoming clogged with the solids deposited by the water on the interior of the coils. The presence of the deposit is indicated by a gradual decrease in the amount of water which will flow through the coils and as the amount of water is decreased the temperature is raised and the deposit of the solid matter becomes more rapid.

Cleaning Water Coils —

Our experience in cleaning these coils has indicated that the best method is to pump in a dilute solution of muriatic acid through them. For this purpose we make use of a 1½-inch all brass centrifugal pump. We start by pumping water through the coils and slowly add muriatic acid until a maximum strength of about 2 pints of acid to 10 gallons of water is used. It is often necessary to pump the acid through for several days before the coils are clean. If acid of the final strength mentioned is used to start with it is likely to result in stopping up the coils completely, and when this occurs it is sometimes impossible to clear the coils even with the use of high pressure. We had one case of this kind, and when the coils were cut open they were found to be solidly plugged with very dense iron oxide. In this case the water came from a deep well pump and examination showed that the pump casing in the well had been eaten away by electrolysis and the iron transferred to the interior of the transformer coils in the form of iron oxide. This of course was an unusual case.

Prevention of Leaks —

Some of the older transformer coils were made of very thin brass tubing and after some years of service these coils gave a great deal of trouble due to leaks produced by local galvanic action set up through impure water by the dissimilar metals composing the brass. In a few cases leaks developed in these coils which allowed sufficient water to get into the transformer, before it was detected, to short the transformer windings. In more recent years copper has replaced brass for transformer coils and heavier tubing used, making more durable coils. While iron coils seem to be meeting with some favor, they are open to the objection that iron has much lower heat conductivity than copper, thus requiring greater coil area and weight for equal cooling effect and also a greater labor cost, which is hardly offset by the difference in the price of metals. A further objection to the use of iron lies in the fact that it is subject to more rapid corrosion than copper.

It is of course apparent that much of the trouble that developed with transformer water coils, both as to their becoming clogged and as to their leaking, could be avoided by the use of an effective purrifying system for the water, but where a large number of substations are involved, as well as a large number of different kinds of water, the cost of an effective purifying system of water is considerable.

In the case of new installations the simplest and cheapest means of avoiding trouble with transformer water coils is not to use them. In sizes up to 1000-kva. self-cooled transformers now cost little if any more than water cooled transformers and when the cost of installing and maintaining a cooling water circulating system in connection with water cooled transformers is considered, together with the other costs incident thereto, it is my opinion that the use of water cooled transformers is undesirable even in sizes much larger than 1000-kva.

PUNCTURE OF SUSPENSION INSULATORS

BY CLEM A. COPELAND
Technical Assistant, Bureau of Light and Power, Los Angeles

The trouble dealt with here occurred on a 110,000-volt, 3-phase, 50-cycle line with neutral of transformers grounded at both ends, and two vertical circuits of 300,000 c.m. 19 strand copper cable steel towers 44.13 mi., with no branches, at a point 29 miles from San Francisquito Power Plant No. 1 on the summit of the Newhall Hills, at an altitude of 2350 feet. The weather was foggy and wet but calm. The temperature was about 55° F.

Nature of Trouble —

The single suspension middle cross-arm string on the east circuit of 7 insulators failed by the 6 lower insulators puncturing between pin and cap forming a crater from ½ to ¾-inch in diameter, all craters being approximately in the same vertical plane at right angles to line direction on the leeward side of the string away from the tower. The tower is at a sharp vertical angle, therefore the strain is great. The 6 lower insulators which failed were manufactured in 1912, but were not put in service until February, 1917. The top insulator was made in 1915 and put in service in February, 1916.

On the same tower on July 17, 1919, the top strings on the same circuit failed in a similar manner, at 4:30 a.m. during a heavy wet fog. On April 1 and on July 19 the same trouble happened on single dead-end strain strings of two of the same kind of

insulators on No. 2 solid wire, 33,000-volt lines in Los Angeles.

Cause —

The cause of the trouble is obscure, but several theories have been advanced:

(a) Sharp ridged corrugation on pin form rings of high electrostatic density and strain.
(b) Unyielding cement between metal of one coefficient, in conjunction with
(c) Heavy strain due to vertical angles in line.
((c) does not seem to be borne out in the case of 33,000-volt lines.)
(d) Flat top of insulator under cap and flat top of pin cavity may be of a form to introduce shrinkage strains in cooling.

The remedy is implied in the above analysis of causes.

THE ORIGIN OF THE PELTON WATER WHEEL

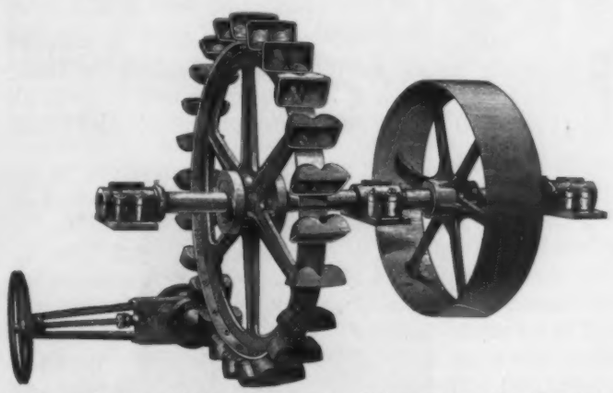
BY CHAS. H. TALLANT

(The term "Pelton Water Wheel" is so familiar as designating a standard impulse wheel that in using it as a classification we almost forget the origin of the name. The following interesting account of its beginning and characteristics introduces us to the inventor and gives the early history of his now world-famous wheel.—The Editor.)

No invention which has been developed to world importance in the states west of the Rockies has a more interesting history than the Pelton water wheel.

A Chance Discovery —

The Pelton water wheel, now designated in the larger sizes as impulse turbines, was invented by Lester A. Pelton, a miner and mechanical engineer, in the late 'seventies in the mining district of California. One summer young Pelton was employed to tend a "hurdy gurdy" wheel, the type of wheel which was then popular in the mining districts. This was a very inefficient wheel of the so-called "butterfly" type, with buckets of single curvature, and Pelton

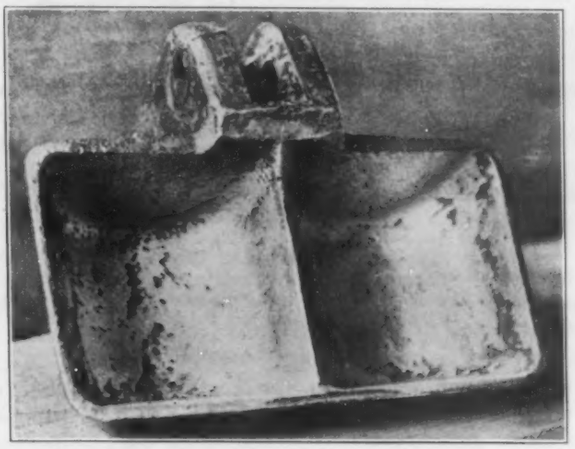


A very early type of Pelton water wheel. Before the incorporation of the company Mr. Pelton specialized on this one model, manufacturing it in six different sizes.

speculated on the possibility of improving its efficiency. One day an obstruction in the water line diverted the jet to one side and caused the water to strike the buckets' surfaces obliquely. An immediate increase in speed resulted, and this gave young Pelton the idea which later resulted in the improved Pelton wheel.

The First Experiments —

The following winter he was forced by heavy snows to spend the winter at a small mining town, Camptonville, occupying a room in a village hotel. The water for the hotel came from a hillside stream and afforded Pelton the opportunity to experiment, though during the day other users limited the supply and forced him to make use of the stream at night. All through the winter he spent his nights in experimentation, trying various shapes of buckets and nozzle arrangements.



Lester Pelton was the first to discover the advantages of the divided bucket. This view shows the bucket he designed with a ridge in the middle.

The buckets, which he shaped by hand from tin cans, were fastened to the rim of a small wheel. His nozzles were constructed in the same way. After many trials he finally evolved the shape of the bucket which was later to bear his name and developed a fairly efficient nozzle.

Preliminary Tests —

The success of the model wheel was so marked that he began the construction of a larger and heavier unit, and by spring had completed a set of bucket patterns. These were patterns of divided buckets, to be of cast iron and belted to the rim of a standard pulley. The patterns were taken to Nevada City, where the buckets were cast, and the wheel was constructed in Allen's machine shop in that town. It was then transported to Grass Valley, where tests were run at the Idaho Mine. A head of approximately 225 feet was available and the wheel developed an efficiency of about 70%. This was considerably greater than the efficiency of any other wheel then in use in the mining districts, and created much interest among the miners.

Later Developments —

Following the success of this crudely fashioned wheel, Pelton made a trip to the State University at Berkeley, where he arranged with Professor Hesse, professor of mechanical engineering, to design and build an impulse wheel in accordance with his own discoveries and the then known laws of hydraulics. Professor Hesse and the four students of his senior class undertook this work and constructed a model wheel about 12 inches in diameter, for which Pelton paid them $500. The tests run on this wheel demonstrated without a doubt that Pelton's ideas were sound and that he had opened the way to limitless opportunities for water power utilization. The model

wheel is still preserved as a valuable exhibit in the engineering college at the University.

From such an obscure beginning, the Pelton wheel has come to be known the world over, as designating the impulse type. The aggregate capacity of this type of wheel now in operation is something greater than 2,000,000 hp.

Formation of the Company —

Patents on the invention were not applied for by young Pelton for several years, and other experimenters did considerable work along the lines of improving existing wheels; but his application was the first to be recorded for an impulse wheel using divided buckets. Some time later the financing of a company for the production of Pelton wheels was carried through by a group of San Francisco men, led by A. P. Brayton. The company was organized as the Pelton Water Wheel Company and was the forerunner of the present corporation of that name.

PRACTICAL LESSONS IN ELECTRICITY

BY H. H. BLISS

(Types of meters, their construction and capacity, and their application to varying currents are discussed in this article on current-measuring instruments. This is the twelfth paper of the series which is being published in connection with the Extension Division of the Universities of California and Oregon. Additional material for the course is supplied by the Universities.—The Editor.)

METERS

Direct Current Instruments. — Practically all electrical meters operate by reason of the production of magnetic fields by electric currents. The earliest indicating instrument was merely a single wire held above a compass needle. A flow of electricity in the wire caused the needle to turn through an angle dependent upon the strength of the current. Running the wire below the needle doubled the turning

Edgewise Ammeter. This instrument is used on station switchboards for metering direct current.

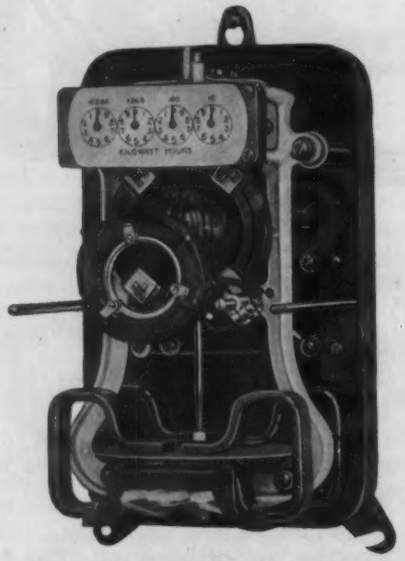
movement and it was a short step to the simple galvanometer which consisted of a compass mounted in a coil of wire with the needle perpendicular to the axis of the coil.

There are serious disadvantages connected with the use of the "moving needle" type of instrument, and these are eliminated in the "moving coil" and "magnetic vane" meters now commonly used. The moving coil meter of the D'Arsonval type has a coil like the armature winding of a motor, and this is placed in a magnetic field. When current (which is led into and out of the coil through spiral springs around the shaft) flows through the winding, the armature turns for the same reason that a motor revolves, but the springs restrain the motion so that the attached pointer moves only a limited distance. The torque depends upon the armature current, and hence the pointer indicates upon its scale a reading proportional to the current.

In instruments of this type every motion of the coil causes the metal bobbin upon which it is wound to move through a strong magnetic field. This induces eddy currents in the metal, the effect of which is to slow the motion and prevent vibration of the coil after the needle reaches the point where the reading should be made. Such instruments are called "dead beat." Other meters do not depend upon eddy current "damping" but contain air chambers in which move vanes which stop the motion by air friction.

Light moving coils with delicate springs can not carry heavy currents, and ammeters of this type usually contain "shunts" which carry a definite fraction of the total amperes in multiple with the coil. The scale of the instrument is marked or "calibrated" to indicate the total current flowing in the coil and shunt.

A "milliameter" or "mil-ammeter" is adapted to measure small currents and marked in thousandths of an ampere. Suppose the coil of such an instrument to have a resistance of 9 ohms and imag-



Interior of a direct current watthour meter. Which is the current coil? Can you explain the use of the disc and the permanent magnets?

ine a coil of 991 ohms connected in series with it inside the case. There would be a total of 1000 ohms between terminals, and if a pressure of 30 volts were applied, the current flow would be only 0.030 amperes or 30 mil-amperes. The scale reading would be 30, exactly equal to the voltage. A voltmeter, then, is simply a very sensitive galvanometer or ammeter with large resistance. Such an instrument is calibrated by connecting it in multiple with a standard voltmeter and altering the voltage by suitable steps.

If it is desired to use a 150-volt voltmeter on a 1200-volt circuit it is necessary to put more resistance in series with it. Manufacturers supply "multipliers" which are simply resistance coils to be used in this way. The meter reading must be multiplied by the appropriate factor to get the pressure.

General Electric Wattmeter. Why are there more terminals than on a voltmeter? Is this instrument built for a switchboard or for occasional use?

Electrodynamometer Instruments.—Many moving coil ammeters and voltmeters have magnetic fields produced either by permanent magnets or by electro-magnets excited by a steady current. The "electro-dynamometer" ammeter or voltmeter, however, has a field coil connected in series with the moving coil, so that the torque depends upon the square of the current. The instruments contain no iron, and the reaction between the coils is spoken of as electro-dynamic, rather than electro-magnetic. The reading scale of such an instrument is not regular or uniform but the marks are much wider apart at some places than others.

The power in a d.c. circuit equals the product of volts times amperes, and it can be conveniently metered by an electro-dynamometer instrument. The moving coil (with high resistance) is connected across the line and takes a current proportional to the voltage. The stationary coil is put in series with the load and so carries the load current. The torque developed is proportional to the product of pressure and current and hence the scale may be calibrated in watts or kilowatts. The divisions may be very nearly uniform. Such a wattmeter may be used for high voltages by connecting a multiplier in series with the voltage coil, and for large currents with the help of shunts like ammeter shunts.

Metering Alternating Currents.—If the current is reversed in a moving needle instrument or in one having a moving coil and a permanent magnet, the pointer will be seen to deflect in the opposite direction. Such meters can not, then, be used on alternating current circuits. Electro-dynamometer instruments, however, operate perfectly with alternating current, for the field of the stationary coil reverses as often as the current in the moving coil, thus producing torque always in the same direction. Hence electrodynamometers are often used for a.c. circuits, as ammeters, voltmeters and wattmeters. They may be calibrated with direct current and used on either kind of circuit.

Various other meters have been developed for use with both direct and alternating current. The "electrostatic voltmeter" consists of moving and stationary vanes which are charged with static electricity by connecting to the opposite sides of a high potential circuit. The vanes are drawn toward each other, moving a pointer against the restraint of a spring. A fountain pen rubbed upon a coat sleeve will attract bits of paper by a similar electrostatic action.

A device used for both ammeters and voltmeters is the "hot wire." Current through a piece of resistance wire heats it, causing expansion which permits a spring to pull a pointer across a scale. Another scheme is to use for a voltmeter or ammeter a stationary coil surrounding two light parallel iron rods, one of which is fixed in position. The other is attached to the pointer and can move around the inside of the coil, always keeping parallel to the fixed rod. Both rods are magnetized when current flows, and the repulsion of like poles causes one to move away from the other. Still another device consists of a soft iron plunger which is sucked into a coil when current flows around it, the plunger being supported by the spindle which carries the pointer. Pocket instruments for testing dry cells are of this type. All these meters will work with more or less accuracy upon alternating as well as direct current circuits, for, obviously, reversing the current does not reverse the effect upon the pointer.

Many alternating current voltmeters, ammeters and wattmeters are of the "induction type." In these a rotating field is produced, as in the induction motor, and this induces in the rotor short circuit currents which tend to turn it on its axis. A restraining spring and a pointer complete the moving element. Such instruments can, of course, only be used on a.c. circuits. An induction wattmeter has certain coils connected across the line and others in series with the load; ammeters and voltmeters have all their coils in series.

Multiplier to use in connection with a voltmeter or wattmeter. What resistance should it have to make a 9000-ohm voltmeter read 140 on a 560-volt circuit? What would the multiplier be called?

Watthour Meters.—Instruments for measuring energy consumption are often mistakenly called "wattmeters." A watthour meter is a small electric

motor so constructed as to use up very little energy and yet to run at a high speed proportional at all times to the power taken by the electrical load on the line. By means of a revolution counter a record is made on the dial of the number of revolutions of the armature, thus accounting for the kw-hr. that have passed the meter. Many d.c. watthour meters have commutators and brushes, the armatures being of high resistance and connected across the line so as to carry current proportional to line voltage. The field is then connected in series with the load. Such meters have no iron at all in the magnetic circuit, which means that the flux and torque are proportional to the voltage and current and no complications are caused by variations in permeability, etc.

Testing meters taken from residences in Fresno, California. Are these wattmeters or energy meters?

Reversing the current in both the armature and series coils of such a meter gives torque in the previous direction, and hence it may be used on a.c. circuits. For several reasons, however, watthour meters of the induction type are generally preferred for such service. These are simply induction motors, lacking commutator and brushes, and thus having no moving contacts.

It is necessary in all watthour meters to restrain the motion of the armature or else even a light load would cause rapid rotation and high readings on the dials. Usually a disc of aluminum is attached to the armature shaft and arranged to rotate close to the poles of strong permanent magnets. Eddy currents are set up which hold back the disc with a force proportional to the speed, and the result is that the speed is made proportional to the driving torque of the armature. In induction watthour meters the retarding disc serves also as armature, the revolving field setting up in one part of it eddy currents which cause it to move, and the stationary magnets setting up in another place currents which retard it.

Curve Tracing Meters.—Many meters are in service which make graphical records or charts. The curve drawn by a recording voltmeter, for instance, tells the voltage at every instant during a period of twenty-four hours. New sheets are inserted daily and thus continuous record is kept, which at any future time may be called upon for information regarding pressure fluctuations, short circuits, etc. Station operators who fall asleep on the "graveyard watch" sometimes are thus betrayed by a record of voltage too high or too low during half an hour.

Such an instrument includes a meter with a pen mounted on its pointer, and a clock for moving a piece of paper uniformly past the point of the pen. The mechanism of the meter may be similar to that of an ordinary electrodynamic voltmeter or wattmeter, but with sufficient turns of wire to give strong forces to overcome pen friction, etc. Other recording instruments make use of relays so that the pen is moved by electromagnets operating when the metering mechanism closes certain contacts.

The Business Library

BY LOUISE B. KRAUSE

(Librarians are born as well as made. The contributory elements in the make-up of a successful business librarian are here analyzed and discussed in the last article of this series on the business library by the librarian of H. M. Byllesby & Company.—The Editor.)

THE ESSENTIAL QUALIFICATIONS OF THE BUSINESS LIBRARIAN

Thoughtful consideration of what the business library does will inevitably lead to one conclusion, namely, that the librarian, who is the director and inspiration of the work, must have greater educational qualifications than can be found in the average office employe who is engaged either in the capacity of stenographer or file clerk. The qualifications which are necessary to make a successful business librarian may be definitely stated as follows:

1. A college education or its equivalent.
2. A library school education or its equivalent.
3. Certain innate mental and social traits.
4. The business man's point of view.

1. A College Education or Its Equivalent

The business librarian, no matter how well educated, will never have a superabundance of knowledge for the prosecution of the task, for the ramifications of business subjects are innumerable and touch the sum total of human knowledge; and while no one person can be master of all subjects, yet a college education, and the mental training which it implies, should give not only a wider knowledge, but a power of adaptability and versatility in working with information, which constitute an indispensable asset in the prosecution of business library work.

The type of college graduate who makes the best business librarian is the one who is able to exercise a high degree of concentration, think clearly and quickly, analyze subjects, understand cause and effects, make logical deductions and wise discriminations, express ideas clearly and to the point, and be able to discuss intelligently the information which he passes along to the business man.

It is only just to state at this point that some college graduates do not measure up to the standards which have been indicated, and that there are many well-educated men and women without college degrees who do; every man or woman must be judged on the basis of individual merit. A business organization, however, can make no more serious mistake than to think it can put its library work into the hands of some one of limited education, who, although he knows the work of the particular business by long apprenticeship, has not the important requisite of a larger point of view which is the result of a broad education, no matter by what means obtained.

W. H. Cameron, when general manager of the National Safety Council, writing of library work as an aid to that organization, stated the facts exactly when he said: "The problem of the industry, the application of the library's information, the method of presentation and the utility of the service, all require trained minds."

2. A Library School Education or Its Equivalent

A liberal education, however, is not sufficient in itself to make a business librarian, unless that education has included the second requisite in the list of qualifications, namely, education in approved methods of library science, according to the standards taught by accredited library schools.

What is meant by library science, and why is it necessary that a business librarian should be trained in it, in order to do adequately the work of the business library? Library science is the standardization of the most approved methods of doing library work, based on the results of many years of study and practical experiment by librarians of large ability who have given their full time and energies to the task. In brief, methods of library work have been standardized by library experts and reduced to a practical, economical, effective science.

If this be the case, what possible justification can be found for business firms who waste time and money, in addition to getting no adequate results, in devising original methods for doing their library work? Trade periodicals, for several years, have published a number of articles treating of original methods adopted by various firms for filing and indexing their printed information. These original schemes reveal many weaknesses and discrepancies and also that many business men are entirely ignorant of the fact that library science has already produced much more excellent ways of working. No man is competent to work with any principle of science, much less modify it, until he is first master of it.

The structure of the business library must be built on the solid foundation of established library science, and there is no fact which business men need to realize more, than that library science as taught in professional library schools is not a simple code summed up in a few text books to be readily mastered by a novice and improved upon at will, but, on the contrary, that it covers a wide range of material, and must be studied by the use of many books devoted to classification, cataloging, reference work and other related subjects. True, there are primers of library science, but as well give a novice a primer on the steam engine and expect him therefore to be adequately equipped to run a power plant, as to put a novice with a library primer in charge of a business library with its highly specialized needs. A business organization would not think of engaging either a stenographer or a bookkeeper who is not trained to do his particular work; how much more, therefore, should a business librarian measure up to recognized standards of library training in order to perform adequately the difficult and important work which he is called upon to do.

The argument for the employment of a trained librarian can be briefly summed up in five words: the trained librarian knows how.

The trained librarian knows how to get and how to use sources of general information, how to keep up with the latest data on business subjects, how to use quickly and accurately the facilities of large city libraries, how to use all kinds of printed indexes, how to classify, catalog, and index material according to standard practice, so that no time or money is wasted in experimenting with inadequate systems, and last but not least, knows how to have a place for everything and everything in its place, so that desired information is immediately available.

As has been intimated, some college graduates cannot grade up to business library requirements, so also, some library school graduates are not suited for business library work, and rarely is a library school graduate, who has not been seasoned first by some thorough library experience, before coming into business library work, fitted for the task. Some trained librarians get so obsessed with the red tape and detail of their library training that they never dare to be original in modifying and adapting their fundamental library principles to new conditions and business problems, and therefore cannot create the type of service which is essential for business.

Some of the advocates of business libraries, having seen library trained people who have "fallen down on the job," speak slightingly of library training, and go to the other extreme, saying that the successful business librarian is born and not made. This is not true, because no innate qualification ever carries with it the ability to succeed in the absence of the proper training. "Both the heritage and the training of the faculties must go hand in hand to insure success." Trained librarians should be estimated by business men in the same manner as they estimate other skilled workers. When an engineer, or in fact any professional man, fails on a piece of work, his employers do not condemn engineering or professional schools as a whole, but try another trained man on the job. If a business man has made a wrong estimate in selecting his librarian, he should not quarrel with library training, but get a higher grade librarian.

The failure of some business librarians who have had both college education and training in library science is due not to inadequate knowledge but to lack of personal qualifications, and while personal qualifications alone will not make a successful

business librarian, neither will a college education and training in library science make a successful business librarian without certain innate mental and social traits.

3. Mental and Social Traits

The mental and social traits required for success in any line of business work apply with equal force to the business librarian, and it is not necessary to enter into any academic discussion of them at this time. Everyone knows that good health, accuracy, thoroughness, common sense, good judgment, tact, integrity of character, and memory (particularly in library work) are indispensable to success in any career, but there are certain traits which a long term of service in a business library and an intimate acquaintance with many business librarians have made clear to the writer, as necessary to success in the business of being a business librarian.

The business librarian must be an executive; he must have not only a balanced view of every detail of library work in relation to its particular whole, but he must especially have an adequate vision of library work in relation to the whole work of his organization, and he must have the ability to see this relationship without waiting for some one to point it out to him. Finally, he must be able to relate the particular business and its existing service, to the work of the world at large.

A librarian serving a prominent business organization was recently asked by the writer, what was the scope of the work of their publicity department in furthering the interests of the organization as a whole, with the result that she could not tell. This librarian only knew that her business was to catalog, classify, put away and be able to get out again the material which was assigned to her care. The executive head of another important business organization has often complained because his librarian was afraid to take any initiative and always waited to be told what detailed policy should be pursued by the library; he was too busy to have to carry it on his mind, and more than that, he really did not know, and needed a librarian who did.

The business librarian must see the need, make the plan, and get all the mechanism necessary for its accomplishment into thorough working order, and have backbone enough to hold the point and have power to make others see it. There is no place in a business library for the mere "bookkeeping" methods, of a recorded and finished job, for the work of the business library is never finished; it is a living force, and like all living things, it is subject to constant change and progress and never gets to the finished stage which suggests the orderly quiet calm of a grave yard!

What the business man wants from his librarian is results, and it is the business of the librarian to know the best way of getting them. The well qualified librarian can give results abundantly, if the business man will delegate authority to act independently in matters of detail, conferring on his librarian as he should, the freedom of action which he gives to the well qualified head of any department, and trusting his librarian to come to him for a conference when the occasion demands. There is no greater handicap to a well qualified librarian than the type of business man who does not delegate authority, and who because of his success in other lines of business, attempts to guide his librarian in matters of library policy about which he knows absolutely nothing.

The business librarian must be unusually resourceful and know how to meet an urgent need for information with quick decision and immediate action. He never says "impossible" until he has tried every possible source of supply.

Probably one of the finest compliments ever paid a business librarian was given by the executive head of a large institution who, having seen the resourcefulness of a certain business librarian in several difficult situations, remarked, "I am confident that if a twenty-story building fell down on Miss B——, she would find a way to get out from under it," and he might also have added truthfully, "and she would also keep a spirit of enthusiasm in the venture," for to the true business librarian the fascination in the game of finding things never wears out.

The business librarian will not be punctilious about adhering to a time schedule for work or to any standard of rights or privileges; he will put the demand of his work first and his personal interests second. If it is necessary to break an important personal engagement made for his free time, because business of importance has arisen in the office, he will do so without any question or irritation. If he can best serve the company in an urgent need, he will not wait to be waited upon by an office boy, but will go himself rather than trust a boy who cannot be relied upon to hurry. The business librarian will not be old-maidish or fussy over any irregular demands which upset his routine work; there is no place in business for the trained librarian who tells a busy man of affairs he cannot have what he wants until certain regular routine has been carried out, and in return the business man should trust his librarian with a freedom of action which is not subject to a time clock or a time schedule.

The business librarian must be able to work harmoniously with "all sorts and conditions of men," and he must convince every one whom the business library serves of honest good-will and impartiality to all, and genuine loyalty to the organization which he serves. He will be discreet and will not gossip about company business on the aside in the office, or on the outside, and last but not least, he ought to have a saving sense of humor. These qualifications may seem exceedingly trite, but the lack of them has been a severe handicap and a glaring defect in many people filling different kinds of business positions.

The successful business man knows the value and power of acquaintance as a business asset, and the business librarian must maintain a wide acquaintance and friendly relationships with other library and business workers, both for practical help and general stimulation. It is a real part of the work of a business librarian to take time to cultivate these outside relationships and attend library conferences,

at the expense of the business organization by which he is employed. The importance of these outside relationships has been noted in the first chapter, as helpful ways of getting information not in print.

The business man who keeps his librarian's nose on the grindstone of routine work, so that he never has an opportunity for outside fellowship and the stimulation that comes from it, soon loses more than he gains by such a policy.

4. The Business Man's Point of View

The busines librarian must also have a genuine and intelligent interest in current political and economic events, and in the kind of information in which business men as a class are interested. He must know the contents of the daily newspaper as well as does the closest reader among business men, so that he will not do as one librarian did—endeavor to give an inquirer an item three weeks old when the latest news on the subject was in the yesterday morning's paper, or waste time looking up statistics on a South American town, which current news reports as having recently burnt down. He must be a constant and thoughtful reader on subjects which pertain to the business of his organization.

The business librarian must have the promoter spirit; he must see that the information which he has on hand is applied and working, and he must be alert enough to see in some measure the undeveloped sides of an industry, and endeavor to bring into the organization, information which may stimulate it to new activities.

To sum up all requirements for a successful librarian: he (or she, as the case may be) must have a liberal education, plus a knowledge of library science, and a sympathetic understanding of business needs, together with the vision and personal power necessary to apply the field of print effectively in meeting these needs.

In conclusion, the business man must face fairly several facts, the chief of which is, that in only a limited number of cases have business libraries measured up to the standards which have been outlined in this handbook, because business firms have not engaged librarians who have the necessary qualifications for success. Some business men have not recognized that there are librarians and librarians, and that many so-called ones are not adequately equipped for business library work. Business men are at fault also because they often do not give personal attention to the selection of a librarian, but leave this selection to an employment manager or a welfare worker who very often does not know just what essential qualifications are necessary for a position. Sometimes the business man does not want to pay the price for an efficient librarian, for no efficient librarian can be obtained for the average file clerk or stenographer salary. One high grade librarian will accomplish more work, both accurately and effectively, than two mediocre ones can possibly do, and is therefore a money-saver.

If there is any doubt in the business man's mind as to whether there is enough library work in his organization to keep a trained librarian continuously busy, it may be said, that in no instance which has come to the knowledge of the writer, has a trained librarian ever been employed by a business organization which has not found there was immediately developed a valuable library service which required the full time and energy of the librarian.

This article concludes Miss Krause's series on the business library. The entire series is now being revised and enlarged and will shortly appear in book form. A new series dealing with the service of the public library to the business man has been arranged to follow Miss Krause's articles in the pages of the Journal of Electricity.

MEASURING THE FLOW OF FLUIDS ELECTRICALLY

BY JACOB M. SPITZGLASS

(The simplicity of the ammeter and watt-hour meter has led to the application of these devices to the measurement of fluid motion in pipes. The method described below was evolved after a series of experiments which were recounted in a paper read at the recent meeting of the American Society of Mechanical Engineers at Detroit. The following is an extract from the paper.—The Editor.)

Despite the fact that the science of mechanical engineering is much older than that of electrical engineering, its methods of measurement are nevertheless in many respects much behind those afforded by the latter. A striking example of this is found in a comparison of the methods of measuring fluid motion in pipes and the flow of an electric current. The instrument used for the electric current is simple and direct-reading, and while there have been many excellent devices adopted for measuring the flow of fluids in pipes, it has been quite generally agreed that an instrument similar to the ammeter or wattmeter would be of great value.

Recently a number of experiments have been made with a flow-measuring device in which these instruments are applied. Measurement is accomplished by means of an electric current which is so regulated by the differential pressure of the flow that it represents the amount of fluid passing through the pipe.

Principle of Operation —

The principle of the device involves a combination of the physical laws governing the flow of fluids in pipes and the flow of an electric current. The units of flow measurement are represented by general equations covering the relation between the velocity of the fluid in the pipe and the differential column obtained by the device. For the units of the electrical measurement, in the standard adopted the maximum capacity of flow is represented by a current of 1 ampere at a constant pressure of 40 volts.

The main features of the device are shown diagrammatically in the illustration. The U-tube, partly filled with mercury, is made to balance the impact pressure of the flow in the pipe by the rise of mercury in the low-pressure side of the tube. The

mercury column also forms a part of the electric circuit, as shown in the figure. This electric circuit contains a fixed external resistance R_1 in series with a variable internal resistance R_2, a constant electromotive force E, an ammeter A and a watt-hour meter W. In the contact chamber C, which forms

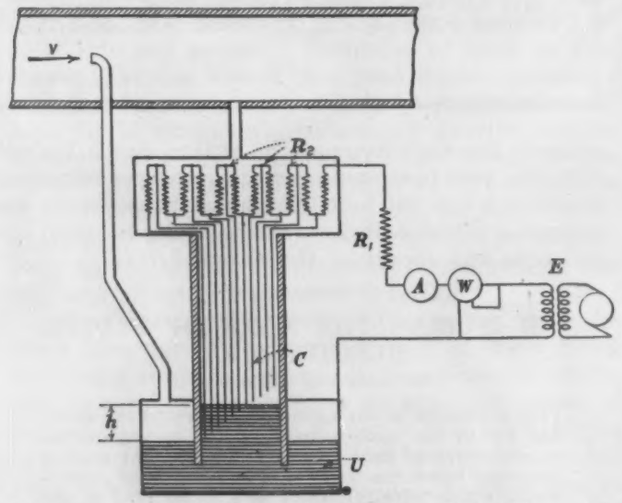


Diagram of electrical device for measuring the flow of fluids in pipes. The electric current is so regulated by the differential pressure of the flow that it represents the amount of fluid passing through the pipe.

the low-pressure side of the U-tube, there are a number of conductors of varying length placed above the mercury column, and as the mercury rises it makes contact with one conductor after another. The variable resistance R_1 is subdivided by these conductors into resistance steps corresponding to the varying length of the conductors, so that the rise and fall of the mercury column varies the amount of resistance and thereby regulates the amount of current passing through the circuit.

Practical Application —

The fact that the flow of fluids can be measured electrically has made possible many important installations where no other method could be employed. In one instance a large manufacturing concern had been contemplating for a long time the adoption of a system for measuring the amount of steam, air and water used by its various departments, but was hindered by the fact that the various lines were distributed over a wide area and in some places were carried through sub-basements, where measuring devices would be inaccessible; also much time and a large force of employes would be required to read the various instruments about the plant and to integrate the recording charts. As soon as the concern discovered that flow could be measured electrically, that the indicating instruments did not have to be located where the flow was to be measured, and that the integrating device was merely a watt-hour meter which integrated the flow independently of the other instruments, a measuring system was instituted for all its products and many wasteful uses of power were thereby eliminated and an accurate distribution of costs established throughout the factory.

When measuring the flow of steam generated by a battery of boilers the flow indicators are placed in front of each boiler, showing the momentary performance for the guidance of the fireman. At the same time, supplementary recorders connected electrically with the indicators are placed conveniently for the supervision of the chief operator.

Recently the manufacturers of water gas adopted the use of low-pressure exhaust steam for gas generation, which created an urgent demand for a measuring device to operate intermittently, varying every few minutes from zero to maximum. After many unsatisfactory trials of mechanical devices the electrical method of flow measurement was adopted, as this made it possible to measure successfully the steam required for the manufacture of water gas and resulted in a great economy.

The main advantage, however, of the electrical method of flow measurement is the accuracy with which the differential pressure is transmitted through a mercury column, which column is not hindered in its movements by any mechanism and is therefore free to attain the true level under all conditions of flow. Furthermore, the electrical instruments used to register the flow can be checked at any time without interfering with the operation or installation of the measuring device.

MELTING POINTS OF CHEMICAL ELEMENTS

This table of melting points of the chemical elements has been issued by the Bureau of Standards in answer to numerous requests for this information.

As nearly as may be, all values, in particular the standard points, have been reduced to a common scale, the thermodynamic scale. At high temperatures some of the values are quite uncertain; thus, while the melting point of platinum may be considered accurately known to 10° C, that of tungsten is possibly uncertain by 50° C or more. Temperatures centigrade are rounded off, and the exact Fahrenheit equivalents are usually given.

MELTING POINTS OF THE CHEMICAL ELEMENTS

Element	C	F	Element	C	F
Helium	<—271	<—456	Neodymium	840?	1544
Hydrogen	—259	—434	Arsenic	850	1562
Neon	—253?	—423	Barium	850	1562
Fluorine	—223	—369	Praseodymium	940	1724
Oxygen	—218	—360	Germanium	958	1756
Nitrogen	—210	—346	SILVER	960.5	1760.9
Argon	—188	—306	GOLD	1063.0	1945.5
Krypton	—169	—272	COPPER	1083.0	1981.4
Xenon	—140	—220	Manganese	1230	2246
Chlorine	—101.5	—150.7	Beryllium (Glucinum)	1280	2336
MERCURY	— 38.87	— 37.97	Samarium	1300-1400	2370-2550
Bromine	— 7.3	+ 18.9	Scandium	?	.....
Caesium	+ 26	79	Silicon	1420	2588
Gallium	30	86	NICKEL	1452	2646
Rubidium	38	100	Cobalt	1480	2696
Phosphorus	44	111	Yttrium	1490	2714
Potassium	62.3	144.1	IRON	1530	2786
Sodium	97.5	207.5	PALLADIUM	1549	2820
Iodine	113.5	236.3	Chromium	1615	2939
Sulphur	S_I 112.8	235.0	Zirconium	1700?	3090
	S_{II} 119.2	246.6	Columbium (Niobium)	1700?	3090
	S_{III} 106.8	224.2	Thorium	>1700	>3090
Indium	155	311		<Mo.	<Mo.
Lithium	186	367	Vanadium	1720	3128
Selenium	217-220	423-428	PLATINUM	1755	3191
TIN	231.9	449.4	Ytterbium	?	.....
Bismuth	271	520	Titanium	1800	3272
Thallium	302	576	Uranium	<1850	<3360
CADMIUM	320.9	609.6	Rhodium	1950	3542
LEAD	327.4	621.3	Boron	2200-2500?	4000-4500
ZINC	419.4	786.9	Iridium	2350?	4260
Tellurium	452	846	Ruthenium	2450?	4440
ANTIMONY	630.0	1166.0	Molybdenum	2550	4620
Cerium	640	1184	Osmium	2700?	4890
Magnesium	651	1204	Tantalum	2900	5250
ALUMINUM	658.7	1217.7	TUNGSTEN	3400	6152
Radium	700	1292	Carbon	>3600	>6500
Calcium	810	1490			
Lanthanum	810?	1490			
Strontium	>Ca<Ba?	.....			

SPARKS—Current Facts, Figures and Fancy

(The latest in wireless telegraphy, profit-sharing, and the generation of electricity appears among these items garnered from the odd corners of the earth. Among other curious things worth knowing—or not, as you please,—are how to run a store in Mexico, how to hoard soap bubbles, and where to go for watermelons. If we told you the name of a certain city jail you would also know which was the most law-abiding town in America.—The Editor.)

Every man in Poland has to have his hair cut close, according to a recent edict, part of an anti-typhus campaign. We believe in hygiene of course—but how is anyone to tell a pianist from a prize-fighter?

* * *

A dog's life is very much so if the dog happens to be the solitary occupant of a city jail. Some presumably model American community reports that its only prisoner is a mongrel accused of appearing in public unaccompanied by a license tag.

* * *

Six-cent metal checks for street car fares are being inaugurated by the Georgia Railway and Power Company. They are of the nature of telephone slugs and are stamped with the Company's guarantee of six-cent value, good for one street car ride.

* * *

In Germany coal is taken from the mine without handling to stations where power is generated at half a cent per horsepower. This power is distributed electrically and not mechanically, which means a very much reduced cost in industries consuming large quantities of power.

* * *

A melon for every man, woman and child in America (—no, this is not a bonus offer) has been grown in Imperial Valley during the past year. Two and one-half million crates and 7,830 cars were required to move the crop; the gross returns totaled approximately $9,208,080.

* * *

A good picture of a donkey or an Indian is a better trade mark in Mexico than any ingenious composite word. The illiterate Mexican asks for his goods by picture, and "Cow" Brand Soap would have a long start over a "Washemclean" brand in attaining popular favor and renown.

* * *

It is estimated that the American women put in about 13,000,000 hours a month during 1918 knitting for United States soldiers and European refugees. From April, 1917 to March, 1919 the American Red Cross produced about 22,000,000 knitted articles of an approximate value of $41,000,000.

* * *

Chairs of aeronautics have been established in England at the universities of Cambridge and London, and several aeronautical scholarships have been instituted. It is reported also that a number of English public schools have acquired from the Air Ministry aeroplanes, motors and other equipment for their engineering section. A scheme of aeroplane insurance is also under way in London.

* * *

Windmills to generate electricity have been successfully used on a number of farms in Denmark during the coal-shortage occasioned by the war. The variable force of the wind was the principal drawback, and attempts were made to design special three-phase dynamos which would maintain a constant voltage independent of the speed of the mill.

* * *

A soap bubble a year old may not sound like fact but it is. A scientist discovered recently that the reason soap bubbles die in their infancy is that ordinary air is filled with tiny particles of matter which fall on the bubble and destroy it by altering the surface tension. If you blow your bubbles in clarified air as the aforementioned scientist did you can have hoards of quite ancient and durable specimens.

* * *

Among adaptations of war materials to civilian uses is the use of an 18-pound shell, with the nose and copper band removed, as a shafting coupling. The copper bands are sold for electrical purposes. Experiments with airplane engines have shown that after an alteration in the carburetor they can be run on coal gas, and with couplings made from shells they have been connected to dynamos with very good results.

* * *

Dividends for employes constitute the latest plan of a large American concern. If a workman earns $20 a week, or $1,000 a year, and the company's common stock pays 6 per cent interest, that employe will receive $60 out of profits at the same time that an investor owning $1,000 worth of stock receives $60 dividends. Everybody on the payroll, from the president to the office boy, participates automatically in the benefits.

* * *

A wireless telegraph receiver which prints dots and dashes at the rate of 400 words a minute is the latest aid to secrecy, no human ear being capable of interpreting radio messages delivered at such a speed. The receiver contains 1000 feet of sensitized tape upon which a tiny mirror oscillated by the electric impulses prints dots and dashes by a photographic process. An electric motor draws the taps through tubes containing developer, fixing hypo and washing water, passing it finally through a drying oven and delivering a complete record easily deciphered.

PERSONALS

Aubrey Drury of Berkeley, California, has been added to the editorial staff of the Journal of Electricity as Associate Editor. Mr. Drury comes to his new position brim full of ideas of helpfulness for the West. He graduated from the University of California with the class of 1914, in which institution as a student he played a most prominent part, especially along the line of debating with Stanford University and the University of Washington. He later acquired a first-hand knowledge of the West as writer for the advertising bureau of the Passenger Traffic Department of the Southern Pacific Company. In this capacity he was called upon to visualize the tremendous natural resources and commercial possibilities of the West. As an officer in the Radio Branch of the Air Service during the war, stationed at Washington, D. C., he acquired first-hand knowledge in many matters pertaining to electrical affairs and engineering activities. During recent months his connection with the Extension Division of the University of California as publicity editor has brought him in close contact with affairs electrical. Readers of the Journal of Electricity will find in future issues much of profit and inspiration as a result of the splendid vision of Mr. Drury.

F. M. Feiker, editorial director of the McGraw-Hill papers, is one of the recent prominent eastern visitors to San Francisco.

H. F. Yost, Pacific Coast manager of the Trumbull Electric Manufacturing Company, is making a trip through through the Pacific Northwest.

M. H. Wagner of the U. S. Bureau of Standards was recently in Salt Lake City gathering information for the National Electrical Safety Code.

Robert W. Larsen has severed his connection with the M. J. Walsh Electric Company and is now in business for himself at 608 McKay Building, Portland, Oregon.

Geo. A. Boring, Portland manager for the Pacific States Electric Company, was among those who came down from the Northwest to attend the recent convention of jobbers at Del Monte.

C. P. Deming, manager of the Seattle office of the National India Rubber Company, 524 First avenue, South, Seattle, is making a visit to the Salt Lake City office of the company, which is in charge of Ray Ackerman.

Jas. H. McGraw, president of the McGraw-Hill Company, Inc., has returned to New York after a visit of six weeks to the Pacific Coast. During his stay in the West Mr. McGraw visited all the important engineering projects, including Hetch Hetchy.

L. A. Francis, for the past two years connected with the Pacific States Electric Company at Seattle in the capacity of salesman, has resigned his position and will represent the Sherry Water Tube Boiler Company with offices in the Lowman Building, Seattle.

Clarence R. Young, recently transferred from sales manager of the Pacific Power & Light Company to the Bond Division of the American Bond & Share Company at New York, has severed his connection with this company and returned to Portland, Oregon, where he has accepted a position with Clark, Kendall & Company as a bond salesman.

C. E. Yost, president of the Nebraska Telephone Company, the Iowa Telephone Company, and the Northwestern Telephone Company, has resigned from the presidency of the three companies and has been made chairman of the board. He is succeeded by Vice-president W. B. T. Belt.

Herbert W. Gepp, general manager of the Electrolytic Zinc Company of Australasia Pty. Ltd., Melbourne and Hobart, Australia, and **Gilbert Rigg** of the Broken Hill Associated Smelters Pty. Ltd., Melbourne, Australia, both prominent engineers, are at present visiting San Francisco.

Frank Hodson, president of the Electric Furnace Construction Company, makers of Greaves Etchells furnaces, is touring the principal western cities including Vancouver, Victoria, Seattle, Portland, San Francisco and Los Angeles, and is at present a guest at the Palace Hotel in San Francisco.

J. W. Sanger, Trade Commissioner of the United States Department of Commerce, will leave shortly for a two years' tour in the Far East to study advertising conditions. Mr. Sanger has recently spent two years in South America investigating methods of advertising and selling American goods, and has written several books on the subject.

Dr. Van H. Manning, director of the Bureau of Mines, accompanied by Mr. Bailey, assistant director, Dr. E. W. Dean, in charge of the petroleum work at the Pittsburgh station, and Dr. Kendle, of the Mine Rescue Division, spent several days during the month of August visiting the San Francisco and Berkeley stations of the Bureau of Mines.

R. H. Ballard, of the Southern California Edison Company, president of the National Electric Light Association, and **John A. Britton,** general manager of the Pacific Gas & Electric Company of San Francisco, have gone east to attend a conference on the policy of the National Electric Light Association, and will visit several of the geographic sections.

G. F. Wakeman, formerly assistant to E. M. Cutting of the Edison Storage Battery Supply Company, with headquarters in San Francisco, has been appointed Pacific Coast manager of the company. As announced in the Journal of Electricity Sept. 1, 1919, Mr. Cutting has been appointed manager of the railroad department of the company at Orange, N. J.

Lee H. Newbert, manager of the Commercial Department of the Pacific Gas & Electric Company of San Francisco, has been appointed chairman of the Committee on Cooperation in the Industry of the National Electric Light Association. Mr. Newbert's committee will endeavor to formulate and submit to the next convention a plan by which all the branches of the electrical business may cooperate. Mr. Newbert has been very active in the California Electrical Cooperative Campaign, of which he has been chairman for several years.

S. M. Kennedy, general agent of the Southern California Edison Company of Los Angeles has accepted his appointment by President R. H. Ballard to the chairmanship of the Committee on Service of the National Electric Light Association. Mr. Kennedy has but recently returned from a combined pleasure and business trip through the East and Canada where he looked into general conditions and called upon the larger central stations. He is well known throughout the electrical industry both as an executive who has taken a leading part in bettering the relationship between the public utility and the public and for his able writings along these lines. The Journal of Electricity looks forward with pleasure to the series of articles by Mr. Kennedy on the personal factors of the public utility which will begin in an early issue.

Clyde A. Flint, sales manager of Rathbone, Sard Electric Company, is expected to attend the Seattle convention of the Northwestern Electric Light and Power Association, to present and discuss a paper on Electric Ranges, a paper which will deal with the manufacture and sale of ranges throughout the country this year. Mr. Flint has covered the entire country and is familiar with conditions in various states and the activities of various companies.

J. G. Pomeroy, a prominent manufacturer's agent with headquarters in Los Angeles, is a recent San Francisco visitor.

E. W. Wagy, petroleum engineer of the U. S. Bureau of Mines, has transferred his headquarters from the San Francisco office of the Bureau to the office at Washington, D. C.

A. H. Burdick of the Electric Bond & Share Company, New York, was in Ogden, Utah, recently, inspecting the gas plant of the Utah Power & Light Company, one of the Bond & Share properties.

Morris Wenk, formerly mechanical draftsman with the G. M. Standifer Construction Corporation at Vancouver, has accepted the appointment of instructor in mechanical drawing at Oregon Agricultural College, Corvallis, Oregon.

W. G. Martin, for the past eleven years connected with the North Pacific Service Company at Bremerton, Washington, has resigned his position and intends visiting with his brother in Yakima for several weeks before making connections with another public service station.

Chas. H. Delany, steam power plant specialist with the Pacific Gas & Electric Company of San Francisco, and joint author of "Fuel Oil and Steam Engineering," is on his way to New London, Conn., to attend a convention of the Edison Illuminating Association where he will speak on oil burning.

L. A. Somers, manager of the Coast Equipment Company, with offices in the Merchants Exchange Building, San Francisco, has recently been appointed San Francisco representative of the Pacific Manufacturing and Electric Company of Los Angeles, manufacturers of the "Ever Hot" Water Heater.

Philip K. Condict, vice-president of the International Western Electric Company, has had conferred upon him by the Emperor of Japan the Order of the Rising Sun, Fourth Class, an honor which comparatively few Americans have received. Mr. Condict has been with the Western Electric Company since 1903, his work keeping him mainly in foreign fields.

R. L. Vandernaillen, formerly general manager of the Oro Light & Power Company, is still heart and soul with the electrical industry. At the recent Santa Cruz convention of the California Association of Electrical Contractors and Dealers he furnished excellent fishing entertainment for many of the leaders of the industry present, among them D. E. Harris, vice-president of the Pacific States Electric Company, R. H. Ballard, vice-president of the Southern California Edison Company, and Harry Bostwick, San Francisco district manager of Pacific Gas & Electric Co.

HAVE YOU SEEN THIS MAN?

Fred Cavanaugh is the subject of an inquiry which has reached the office of the Journal of Electricity. Mr. Cavanaugh, who was engaged in the electrical business in Warren, Ohio, left that city some years ago and is believed to be in San Francisco or vicinity. Eastern connections of the Electric Appliance Company of San Francisco are particularly anxious to get in touch with Mr. Cavanaugh concerning a subject of great advantage to him.

D. C. Pence, sales manager, Illinois Electric Company, Los Angeles, has left for the East where he plans to spend a month visiting eastern firms which he represents on the Pacific Coast.

W. Brewster Hall, district sales agent for the Pass & Seymour Company of Solvay, N. Y., is making a two weeks' visit to San Francisco and other Pacific Coast cities. Mr. Hall is perfecting arrangements with the George Gray Company of San Francisco for carrying a full line of the Pass & Seymour stock.

Harry M. Giles has been appointed general superintendent of the South Philadelphia Works of the Westinghouse Electric & Manufacturing Company. Mr. Giles, who succeeds the late Oscar Otto, killed in an automobile accident last month, has been for a number of years past superintendent of marine erection.

C. H. Beal, formerly petroleum technologist of the U. S. Bureau of Mines, with headquarters at the San Francisco office, has severed his connection with the Bureau to enter consulting work. He will make a specialty of oil land valuation and exploration, and has established offices at the Sharon Building, San Francisco.

W. A. Marsden, vice-president of the Electrical Appliance Company, 1214 Third avenue, Seattle, has just returned from a visit through the East including the factories of the Hurley Machine Company and the Edison Electrical Appliance Company, both located at Chicago. While away he also made a study of the merchandising business as carried on by different stores in Illinois and Iowa.

Frank D. Egan, former works manager of the Pittsburgh Iron & Steel Foundries Company, has accepted a position in the General Engineering Department of the Westinghouse Electric & Manufacturing Company at East Pittsburgh, Pa., where he will devote his entire time to the development of electrical apparatus for steel mill application. Mr. Egan is a member of the Iron and Steel Committee of the American Institute of Electrical Engineers, and a member and past president of the Association of Iron and Steel Electrical Engineers.

Capt. C. E. Grunsky, Jr., who is familiar to readers of the Journal of Electricity through articles on mine valuation which appeared in these columns, has again taken up his engineering work in San Francisco after a two years' absence in the Army, during which time he saw active service at the front and supervised the valuation of war losses in French mines. The American Engineering Corporation, of which Capt. Grunsky was a member, has reorganized under the name of the C. E. Grunsky Company and consists of C. E. Grunsky, the well known consulting engineer and valuation expert, E. L. Grunsky, who has specialized in construction work and water problems, and Capt. Grunsky, who takes care of all mining work.

OBITUARY

Hugo Altmayer, president of the Farnsworth Electrical Works of San Francisco, was instantly killed on September 9th at the Coos Bay Lumber Company's yard in Oakland. Mr. Altmayer was widely known for his electrical inventions, and had gone to Oakland to make some tests in connection with crane operation. While he was standing on a crane an electric shock caused him to fall to the pavement below.

Meeting Notices for Electrical Men

(A full announcement has been issued of the program for the Northwest Electric Light and Power Convention at Seattle, and of general plans for the meeting. An interesting report of the National Executive Committee meeting of the N. E. L. A., and of electrical gatherings in San Francisco are among other features of the past two weeks.—The Editor.)

National Executive Committee, N. E. L. A.

The following members were present at the Executive Committee meeting of the National Electric Light Association, held at Association Headquarters on Thursday, August 14th: Martin J. Insull, vice-president; H. C. Abell, W. H. Atkins, George B. Foster, Walter H. Johnson, John G. Learned, George B. Leland, D. H. McDougall, Leon H. Scherck, Frank W. Smith, Paul Spencer, Thomas Sproule; J. C. Van Duyne, representing R. W. Symes; S. A. Sewall, acting secretary; W. C. Anderson, statistical secretary; A. J. Marshall, secretary Electric Vehicle Section. J. W. Perry, chairman of the Exhibition Committee, attended by invitation.

In the absence of President Ballard, Vice-President Martin J. Insull presided and called the meeting to order.

Chairman Perry presented the report of the Exhibition Committee, reviewing the work done in advance of the convention scheduled for Atlantic City in 1917 and the work accomplished this year. He reported that the prizes of $150, $100 and $50 for the best papers describing the exhibit as a whole had been awarded; that there were 95 exhibitors this year, the largest from the standpoint of number and square feet of space in the history of the Association, and that 25 exhibitors had to be refused on account of their late applications. Mr. Perry also reported the following officers and members of the Executive Committee elected for the year 1919-1920: C. L. Peirce, Jr., chairman; F. H. Gale, treasurer; H. G. McConnaughy, secretary. Members of the Executive Committee for one year, J. C. McQuiston, George A. Hughes, G. A. Freeman; for two years, C. L. Peirce, Jr., S. E. Doane, Frank H. Gale; for three years, Charles Blizard, John Mustard, J. W. Perry.

Vice-President Insull read a letter from John F. Gilchrist, chairman of the Publicity Committee, outlining his plans for the committee. These plans provide for the establishment in each state of a committee similar to that already organized in Illinois, which committees will finance themselves and will furnish news bulletins to their members; the chairmen of the state committees to form the personnel of Mr. Gilchrist's main committee. Mr. Gilchrist felt that it would be desirable to include the railway, gas and telephone people, and that this would probably mean that in some cases the chairmen of the state committees would not be electrical men, but he did not feel that there was any objection to this.

The question of distribution of the several handbooks of the Association was referred to a special committee consisting of the chairmen of all national sections, chairmen of the Membership and Company Sections Committee, and the treasurer. This committee is to consider the question of continuing the policy of furnishing the handbooks free or whether some charge might be made for them in order that they might be self-sustaining, and the committee after investigation will report to the president.

The Membership Committee reported new members as follows:

Six central stations, Class A; 7 manufacturers, jobbers, contracting firms, Class D; 203 company employes, Classes D and E; 1 foreign member (Snider & Company, Paris); 1 college professor, Class C; total, 218 new members during the month of July.

The special committees on the subject of Insurance Expert reported in favor of the Association continuing such expert on insurance matters, to be at the disposal of the member companies as well as committees of the Association, and to be available at all times in connection with any cases relative to insurance matters that have to do with the work of the Association; the insurance expert to be ex-officio member of all committees having to do with such matters and to keep the Association informed from time to time of the work of the National Fire Protective Association Committee.

The Executive Committee considered another subject which had been suggested for the Association, namely, that an effort be made to bring about closer contact between bankers and other financial interests with the Association and member companies, in supplying funds for extensions required by the utilities.

The question of distribution of the Proceedings of the 1919 Convention was considered, the secretary being instructed to send out notice in card form and get replies from members as to which volumes of the proceedings each member desired to receive.

The vice-chairman of the Accounting Section reported the Section committees actively at work, and the affairs of the Section progressing satisfactorily.

A similar report was made by Chairman Foster of the Electrical Vehicle Section, who also reported that the municipal authorities of New York were investigating the broad subject of harbor, steamship and railroad terminal facilities, including transportation of freight over city streets to such terminals. As street transportation is closely associated with electrical vehicles, the chairman advocated an energetic campaign to bring to the attention of the investigating committee the merits of city transportation by means of electric vehicles.

BUILDERS OF THE WEST — LXI

JAMES H. McGRAW

"Let there be light" has ever been the divine command that has brought into consciousness the intelligence wherewith to govern the affairs of man. That man of vision who sits at the head of a great publishing house, alert to sense the needs of industry and point to the better way, is indeed the empire builder of the first order. To James H. McGraw, president of the McGraw-Hill Company, Inc., publisher of eleven engineering magazines, leaders of thought in their respective fields of activity and carrying a message to 180,000 engineers and commercial men throughout America and the world at large, this issue of the Journal of Electricity is affectionately dedicated.

Chairman Learned of the Commercial Section reported on the second meeting held by that Section at Association Island the first week in August, at which time bureaus and committees were appointed, and he submitted the two following resolutions adopted by the Commercial Section:

"Whereas, The Commercial Section of the National Electric Light Association has given much time and care to the preparation of folders, pamphlets, booklets and handbooks for the purpose of advertising electrical appliances and educating the public to the end that a greater number of electrical appliances will be purchased and used, now therefore be it

"Resolved, That the Executive Committee of the Commercial Section is of the opinion that all advertising, publicity and educational literature prepared by the Commercial Section should be made available to all branches (companies, individuals, etc.) of the electrical industry, whether or not they be members of the National Electric Light Association."

"Whereas, Numerous applications for the Commercial Engineering Course and the Course in Practical Electricity are received from universities for use in their electrical engineering classes, from young men attending schools giving a general education and from central stations desirous of preparing men and women to enter their employ,

"Resolved, That educational courses prepared by the Association be made available to all who may subscribe to same."

The course of procedure recommended in these resolutions was discussed by the committee, but final action deferred until the next meeting, at which the president will preside.

Electrical Meeting in San Francisco

On August 27th an important luncheon was held at the Palace Hotel at San Francisco, the following electrical men being present: A. E. Wishon, A. H. Halloran, C. C. Hillis, L. H. Newbert, Robert Sibley, Clyde Chamblin, J. W. Redpath, E. O. Shreve, M. T. Dolman, I. W. Alexander, Henry F. Jackson, Paul Downing, A. N. Kemp, D. E. Harris, Jas. H. McGraw, M. A. DeLew.

The luncheon was preceded by a symposium, covering what electrical men are planning for the ensuing year. Mr. Wishon took the chair.

At the luncheon Robert Sibley, editor of the Journal of Electricity, presided and James H. McGraw, president of the McGraw-Hill Company, Inc., announced the forthcoming affiliation of the Journal of Electricity with the McGraw-Hill Company. In commenting on this, John A. Britton, general manager of the Pacific Gas & Electric Company of San Francisco, referred to it as one of the most significant announcements ever made to the electrical industry.

Electrical Picnic in Southern California

The entire electrical fraternity of Southern California united recently at the big Electrical Picnic held at Anaheim Landing, twenty-five miles from Los Angeles.

All the electrical contractor-dealers and jobbers closed their establishments for the day. As the street cars were temporarily out of service, on account of the strike, enough automobiles were procured to convey everyone—their wives, daughters, sons and sweethearts—to the scene of the picnic.

A spectacular ball game held the crowd in a high pitch of excitement the entire morning. The electrical contractor-dealers, captained by H. B. Woodill of Woodill & Hulse, played the manufacturers and jobbers team, captained by John M. Morris of the Westinghouse Electric & Manufacturing Company. After a thrilling nine innings, Captain Morris came out victorious, with a score of 5 to 0.

The afternoon was spent in various sports arranged by the Sports Committee, consisting of R. J. McHugh, with the Garnett-Young Company, assisted by W. R. Edwards of the Pacific States Electric Company and Ralph Clapp, manufacturers' agent, recently returned from France.

P. H. Gough of Listenwalter & Gough, making one of his long distance drives at the electrical picnic at Anaheim Landing. The golf contest was one of the features of the occasion.

A golf driving contest routed out the golf enthusiasts and after some spectacular drives, the contest was finally won by D. R. Edwards, with A. W. Childs a close contestant.

Dinner was served at the Tower Inn and was followed by dancing.

The committee in charge of the picnic consisted of J. C. Rendler of the Southern California Electric Company, Paul D. House of the Lamp Shop, representing the electrical dealers; Louis Gans of Gans Bros., representing the Motor Repairmen's Association; L. M. Harper, manager of the Western Electric Company, representing the electrical jobbers, and Carl M. Heintz, Westinghouse Electric & Manufacturing Company, representing the manufacturers.

National Fire Protection Association

Special committees have been appointed by the Chairman of the Electrical Committee of the National Fire Protection Association to consider various questions in anticipation of the 1920 Code. All persons interested in any of these questions are invited to communicate with the Chairman of the Technical Sub-Committee which is dealing with that particular question.

Ralph Clapp, recently returned from service as a Y. M. C. A. Secretary in France, was evidently glad to be back in time to attend the electrical picnic.

H. B. Woodill, president of the Woodill & Hulse Electric Company, and J. M. Morris of the Westinghouse Company, were the competing captains in the ball game played at the electrical picnic at Anaheim Landing. Mr. Woodill's team was selected from the Contractor-Dealers and Mr. Morris's from the Manufacturers and Jobbers. The score was 5 to 0 in favor of the latter team.

A. W. Childs, superintendent of sales with the Southern California Edison Company, looking over the prizes given away at the electrical picnic.

Northwest Electric Light and Power Association Convention

PROGRAM

The business program for the Northwest Electric Light and Power Association convention, which takes place in Seattle on Sept. 24, 25, 26 and 27, is as follows:

Wednesday, September 24

Morning Session —

Address of Welcome—Mayor of Seattle.
President's Address—H. J. Gille.
Resolutions Committee (appointments).
Financial Report.
Committee Reports.
Special Address.
Announcements.

Afternoon Session —

TECHNICAL COMMITTEE REPORT—Chairman G. E. Quinan, Puget Sound Traction, Light & Power Company.

In brief this report covers the valuable work the committee has been doing in connection with National Safety Code, Meters, Transmission, Prime Movers and construction of all kinds.

ACCOUNTING—Editor-in-Chief J. S. Simpson, Washington Water Power Company.

This paper will cover proper methods of accounting, both for city and suburban electric business, setting forth the most desirable methods of handling company and customer's accounts in both these divisions, covering also plans for reducing accounting and billing expense.

Evening Session —

ELECTRICITY TODAY—Dr. Wm. H. Easton, Westinghouse Electric & Manufacturing Company.

Popular lecture for all visitors to the convention, including ladies, also selected guests by invitation. This will be a semi-popular and semi-technical review of the more modern applications of electricity, and will include many of the very interesting and marvelous things developed in an electrical way during the war. The program committee is particularly fortunate in having this subject presented by a national authority. Motion pictures and slides will be used to illustrate this lecture.

Thursday, September 25

Morning Session —

IMPROVING ELECTRICAL MERCHANDISING—Round Table Conference; Chairman, L. A. Lewis, Washington Water Power Company.

To be participated in by speakers assigned by the chairman from among central stations, manufacturers, jobbers, contractors, etc., followed by an open discussion. Conference to be attended by convention as a whole.

This conference will bring before the convention the latest ideas and experiences covering the most progressive methods for increasing appliance sales.

Afternoon Session —

RANGES AND WATER HEATERS — Round Table Conference. Chairman, A. C. McMicken, Portland Railway, Light & Power Company; Vice-Chairman, J. F. Roche, Montana Power Company.

To be participated in by speakers assigned by the Chairman from among central stations, manufacturers, jobbers, contractors, etc., followed by an open discussion. Conference to be attended by the convention as a whole.

This conference will bring before the members much very valuable information and specific data, and it is planned that all the important questions in connection with the range and water heater business will be presented from varied sources, embracing design, contemplated changes, maintenance, distribution problems, diversity factor, cost of ranges, water heaters and maintenance, rates, etc. It is desired also to reach a conclusion on the general subject, "Have Experiences in the Past Three Years Fulfilled Expectations?"

Friday, September 26

Morning Session —

VALUE OF PUBLIC UTILITY WAR EXPERIENCES AND THEIR EFFECT ON THE FUTURE—Editor, W. H. McGrath, Puget Sound Traction, Light & Power Company.

This paper will bring before the convention in a broad way the benefits to be derived in the future from our recent experiences in handling the problems confronting central stations during the war, covering such important matters as investments, service, rates, extensions and future relations with the public.

Afternoon Session —

INDUSTRIAL ELECTRIC HEATING—C. A. Winder, General Electric Company.

This is a very valuable paper covering such important features as The Electric Furnace, Heat Treating, Gun Shrinking, Enameling, Core Baking, Welding, Fruit and Vegetable Drying, Bake Ovens, Vulcanizing, in fact every conceivable beneficial application of electric heat to the industries from the largest to the smallest; also forecasting the possibilities of this branch of our business constituting the major portion of future central station loads.

Immediately following this paper will come the report of the nominating committee and the election of officers.

The Program Committee in charge of the arrangements consists of R. W. Clark, chairman, A. C. McMicken and T. A. Lewis.

In addition to the business program, an attractive series of events has been planned by the Entertainment Committee, under the chairmanship of J. I. Colwell, as follows:

Thursday, September 25th—Afternoon theatre party for the ladies, the name of the theatre and time to be announced at the time the ladies register.

Friday, September 26th—Banquet Friday night, 6:30 p.m., at the Army and Navy Club on Third Avenue.

Saturday, September 27th—This will be the first golf tournament, which it is hoped will become an annual event. In view of the increasing interest taken in the game by the members of the Northwest Light and Power Association, it has been decided to inaugurate an annual handicap competition for a trophy to be known as the "Kilowatt Cup." This will be the property of the winner for one year unless he should win it the second time. A small replica will become the permanent property of the winner of the tournament. A special event known as the Kickers' Handicap will be played simultaneously with the tournament for the "Kilowatt Cup."

The tournament will be played at Jefferson Park Golf Club. Automobiles will leave Washington Hotel at 9 a.m. sharp. Entries must be made not later than 6 p.m. Friday, Sept. 26th at the headquarters of the Seattle Press Club. Competitors will play 18 holes Medal Play on handicap as assigned by the committee, R. T. Stafford and H. H. T. Van Riper.

Registration for the convention will be at the Press Club headquarters, Fifth and University streets.

Through the Journal of Electricity arrangements have been made for a special car, which will leave San Francisco for Seattle at 10 p.m. on Monday, Sept. 22. Among those going north to the convention are: A. E. Wishon, assistant general manager of the San Joaquin Light & Power Corporation, W. H. Onken, Jr., editor of the Electrical World, Robert Sibley, editor of the Journal of Electricity, W. S. Berry, Pacific Coast sales manager for the Western Electric Company, and D. E. Harris, sales manager of the Pacific States Electric Company.

PROPOSED CHANGES IN CONSTITUTION

Amendments will be made to the Constitution with the idea of effecting certain changes in organization and procedure that will make the Association more effective and work to better advantage.

It is proposed to greatly strengthen local activities through the Public Policy Committee for each state. These committees are to be composed of a representative from each Class A member and are to be largely self-governing in all matters of public policy as they pertain to each state. A fixed division of funds going into the Association's treasury is to be made between the Association's needs for the general conduct of its work and the work of the local committees. Local committees are also to be empowered to levy an equitable assessment upon Class A members when necessary, with the approval of the Executive Committee, and as all Class A members are represented on the local committee no such action will be taken unless acceptable to those who must meet any assessment. Funds for the benefit of local committees are to be disbursed by the treasurer to the vice-president for each state, through whom local public policy affairs will be largely directed.

It is proposed to further amend the Constitution by providing for reconstituting the Executive Committee, the governing body of the Association. The committee is to consist of the president, the retiring president and three members at large, as already provided, but instead of the other four members being elected at large the vice-president for each state, Idaho, Montana, Oregon and Washington, will be a member. The vice-presidents, under the new arrangement, are to be more active, to direct state activities, and appoint the Public Policy Committee for each state.

Geo. L. Myers, chairman of the Public Policy Committee for Oregon, has proposed that the activities of the membership be specifically directed, and in this connection has suggested the organization of the membership into sections, in order that the members may be in position to exert their efforts in Association activities along lines in which they are engaged and interested. In this manner it is hoped to get more out of the membership and arouse and maintain the interest of the individual.

The article providing for sections is as follows:

ARTICLE XIV

Sections

Section 1. Members shall be classified into sections, and there shall be the following sections:

Accounting,
Commercial,
Public Relations,
Technical.

Section 2. Each section shall have a Governing Committee, of not less than three nor more than nine members, to be appointed by the president, and the chairman of the Governing Committee of each section shall be named by majority vote of said committee.

Section 3. The term of each member of the Governing Committee of each section shall be three years from the 30th day of September of the year of appointment; provided, that the term of one-third of the members of each committee shall terminate each year, the term of one-third of the members appointed by the president elected in September, 1919, to terminate with the years ending September 30, 1920, September 30, 1921, and September 30, 1922.

Vacancies shall be filled by appointment by the president for the unexpired term.

Section 4. Membership in each section shall be optional with any member and shall be continuing at the option of any member, and any member may change his affiliation from one section to another section, except that he can be a member of no more than one section; provided, that the president shall direct the classification of any member who has failed to specify affiliation with any section within a reasonable time.

Section 5. The president shall appoint the Governing Committee of each section within thirty days after the completion of the classification of the membership of each section, and the president shall direct and complete the classification of the membership of each section as provided for herein under such rules and regulations as the president may prescribe within a period of ninety days following the adoption of this Article; and thereafter the president shall prescribe the rules and regulations for classification and re-classification.

San Francisco Electrical Development League

The Electrical Development League of San Francisco held a well-attended and enthusiastic meeting on September 8th, at which John S. Poland, Pacific Coast sales manager of the Safe Cabinet Company, gave an interesting talk on protecting valuable records. Henry Bostwick, president of the League, expressed his gratification at the large attendance, this being the first meeting since summer vacation.

One of the events of the meeting was the presentation of a fountain pen to E. M. Cutting who goes East shortly to take the position of manager of the railroad department for the Edison Storage Battery Company at Orange, N. J.

F. M. Feiker of the McGraw-Hill Company, Inc., announced the affiliation of the Journal of Electricity with the McGraw-Hill Company.

Among the distinguished guests was S. M. Kennedy, general agent of the Southern California Edison Company, who has recently returned from the East, and who spoke a few words on the subject of the strong Eastern interest in the electrical progress of the West.

The N. E. L. A. Convention

Already there is an interesting rivalry among the cities of Southern California for the honor of being selected as the place of holding the 1920 convention of the National Electric Light Association. The news that the next convention of the national organization was to be held somewhere in the southwest was well rated by the committees of city councils and chambers of commerce of the larger cities of the Southwest, and President R. H. Ballard is in receipt of a number of invitations which he will submit to the Executive Committee at its meeting in September. A selection will no doubt be made at this meeting, after which the first preliminary work for the session will be put under way.

Los Angeles, the metropolis of the Southwest, with a national reputation as a convention city and rated for the hospitality it extends to those who visit it as representatives of important organizations, is eager to secure the convention. Its magnificent hotel accommodations, its central location, its proximity to the chain of beach resorts and its wonderful roadways and interurban electric lines, radiating in all directions, have much to commend it.

Pasadena, the Crown City of the San Gabriel Valley, under the shadow of Mt. Wilson and in the center of some of the most beautiful scenery in Southern California and only nine miles from Los Angeles, would be an ideal place for the session.

Riverside, in the center of the great orange and lemon belt, with superb scenery on every hand and close to some of the great hydroelectric plants, desires to be considered.

San Diego, on one of the most remarkable natural harbors in the world, with magnificent hotels and all the attractions that eastern visitors enjoy, has presented its claims.

Santa Barbara, the romantic and historic city by the sea, with its lore of other days, its wonderful old mission, some of the best hotels in the West and excellent facilities for entertaining, has also put in a request for the coveted honor.

President Ballard says that he will try to present all of these requests to the members of the Executive Committee in as impartial a manner as possible, requesting the members to make the selection, as he feels those who reside in other sections of the country should be best qualified to choose the place that would best suit the visitors to Southern California.

AIMS OF THE GEOGRAPHIC SECTIONS OF THE NATIONAL ELECTRIC LIGHT ASSOCIATION

By R. H. Ballard, President N. E. L. A.

In the Geographic Section we provide the electrical industry with the intermediating link between the central station, which is the unit of activity from which ideas naturally germinate, and the National Electric Light Association, which is transcontinental in its policies and its aims.

In the Geographic Section the greatest opportunity is offered for personal contact and interchange of ideas between executives and employes of the company and all others interested in the electrical industry within the territory where conditions are frequently identical and usually similar.

In the Geographic Section the results of progress made and new ideas demonstrated by one company may be quickly conveyed to other companies in the same territory.

In the Geographic Section opportunity is afforded men to think in broader terms and to apply their reasoning along sectional lines. This is the logical sequence of development—company to section; section to nation.
The natural foundation for this line of progress is the company sections, and its importance is inestimable.

In the Geographic Section the maximum opportunity is presented for cementing all branches of the industry into one harmonious whole; of increasing the sphere of influence exercised by those engaged in our profession, and in eventually creating a better understanding between the public served and those whose duty it is to serve the public.

In the Geographic Section a complete understanding should be reached between central stations, manufacturers, jobbers and contractor-dealers, as to the rightful place in the industry occupied by each group and in establishing the relations of one branch of the industry to the others.

In the Geographic Section we have a place where misunderstandings, frictions, petty jealousies and fancied injuries can be ironed out and adjusted by bringing about a full and complete realization by all members of the section of the responsibility of service to the public and the joy of working out practical accomplishments of the ideal.

In the Geographic Section can best be worked out a definite plan by which the public may be kept informed on the true status of utility service in the district served.

In the Geographic Section there is ample opportunity for constructive initiative, and the opportunities for its exercise could be amplified indefinitely, the scope of achievement having no limitation but brains and ability.

In the Geographic Section we have the medium of crystallization; demonstrating and applying locally when local, and making universal when universal all of the constructive creative forces that exist in the minds of the great membership of the National Electric Light Association.

WHERE THE MEN OF THE INDUSTRY MEET

(The place where you can find where and when the other man meets. Information as to changes in officers, or additions or corrections, should be addressed to the Service Editor, Journal of Electricity. It is hoped to keep this directory up to date, so that travelers in a strange town who wish to attend the meetings of allied groups may not be misdirected.—The Editor.)

A. I. E. E.—WESTERN SECTIONS

National Officers
President—Calvert Townley, Westinghouse Electric & Manufacturing Company.
Secretary—F. L. Hutchinson, Engineering Society Bldg., New York City.
Meetings—Monthly.

Los Angeles Section
Chairman—J. H. Cunningham, General Electric Co., Los Angeles.
Secretary—Clem A. Copeland, Bureau of Power and Light, Los Angeles.
Meetings—Second Tuesday of each month.

Portland Section
Chairman—W. D. Scott, Pacific Telephone & Telegraph Company, Portland, Ore.
Secretary—E. H. Le Tourneau, Portland Railway, Light & Power Company, Portland, Ore.
Meetings—Monthly.

Denver Section
Chairman—Prof. H. S. Evans, Univ. of Colorado, Boulder.
Secretary—Robt. B. Bonney, Mountain States Tel. & Tel. Co., Denver, Colo.
Meetings—Third Saturday of each month, at the Shirley Hotel.

San Francisco Section
Chairman—W. G. Vincent, 445 Sutter St., San Francisco.
Secretary—Allen G. Jones, Rialto Bldg., San Francisco.
Meetings — Fourth Friday each month—Engineers' Club, 7 p.m.

Seattle Section
Chairman—John Harisberger, 4015—4th Ave. N. E., Seattle, Wash.
Secretary—T. C. Smith, City Lighting Department, Seattle, Wash.
Meetings—Monthly on third Tuesday in Chamber of Commerce Assembly Room, 9th floor, Arctic Bldg.

Spokane Section
Chairman—George Nixon, Main and Lincoln Sts., Spokane.
Secretary—G. H. Hoppin, 1128 W. Kiernan Ave., Spokane.
Meetings—Third Friday of each month.

Utah Section
Chairman—A. S. Peters, Mountain States Telephone & Telegraph Co., Salt Lake City, Utah.
Secretary—H. T. Plumb, 183 U St., Salt Lake City, Utah.
Meetings—Third Wednesday of alternate months, 8 o'clock. Assembly Room of Commercial Club, Salt Lake City.

Vancouver Section
Chairman — R. F. Hayward, Western Canada Power Co., Ltd., Vancouver, B. C.
Secretary — T. H. Crosby, Canadian Westinghouse Co., Vancouver, B. C.

A. I. E. E.—WESTERN BRANCHES

University of California Branch
Chairman—A. E. McMahon, University of California, Berkeley, Cal.
Secretary—D. D. Davis, University of California, Berkeley, Cal.

University of Colorado Branch
Meetings—First and third Thursdays of each month of the school year in the Engineering Building, University Campus.

Idaho University Branch
Meetings — First Wednesday evening of each month from October to June.

University of Washington Branch
Chairman—Jack Tolmie, Univ. of Washington, Seattle.
Secretary—Glen Walker, Univ. of Washington.
Meetings—Monthly, first Tusday, Forestry Bldg.

Oregon Agricultural College Branch
Chairman—Lawrence Fudge, Oregon Agr. College, Corvallis, Ore.
Secretary—Otto L. Cantrall, Oregon Agr. College, Corvallis, Ore.

Stanford University Branch

Montana State College Branch
Secretary—J. A. Thaler, Montana State College, Bozeman, Mont.
Meetings—Third Friday of every month of the school year in the Electrical Bldg.

Throop College of Technology Branch
Chairman—Mark Sawyer, Throop Dormitory, Pasadena, Cal.
Secretary—Russell Otis, Throop Dormitory, Pasadena, Cal.

State College of Washington Branch
Chairman—Clarence E. Guse, Pullman.
Secretary—Ralph C. Guse, State College of Washington, Pullman.
Meetings—Bimonthly at Mechanics Art Bldg., Pullman, Wash.

CONTRACTOR-DEALER ASSOCIATIONS

National Association of Electrical Contractors and Dealers
Chairman—W. Creighton Peet.
Secretary—W. H. Morton, 110 West 40th St., New York.
Executive Committeemen, Pacific Division—J. R. Tomlinson, Portland, J. F. NePage, Seattle, Wash.

Electrical Contractors & Dealers of Salt Lake City
President—G. W. Forsberg.
Secretary—E. H. Eardley, Eardley Bros., Salt Lake City.

British Columbia Ass'n Electrical Contractors and Dealers
President—E. Brettell, Vancouver, B. C.
Secretary—Capt. W. J. Conway, Vancouver, B. C.
Meetings—First Tuesday of each month.

California Ass'n of Electrical Contractors and Dealers
President—M. A. De Lew, 180 Jessie St., San Francisco.
Secretary—J. W. Redpath, Rialto Bldg., San Francisco.
Meetings—Monthly.

Denver Electrical Contractors' Association
President—E. C. Headrick.
Secretary—C. N. Shannon, 227 Coronado Bldg.
Meetings—2nd and 4th Monday nights of each month.

Electrical Contractors and Dealers Ass'n of San Francisco
President—C. L. Chamblin, 641 Mission St., San Francisco.
Secretary—Louis R. Ardouin, San Francisco.
Meetings—Friday, 12:30; New Call Bldg.

Southern California Electrical Contractors and Dealers
President—G. E. Arbogast, 724 So. Olive St., Los Angeles, Cal.
Secretary—J. E. Wilson, 425 Consolidated Realty Bldg., Los Angeles, Cal.
Meetings—Every Friday at 6:30 p.m. at the Pin Ton Cafe, 427 South Broadway.

Monterey Bay Electrical Contractors and Dealers
President—W. Cox, Santa Cruz.
Secretary—D. K. Noggle, Monterey.

Nevada Ass'n of Electrical Contractors and Dealers
President—F. V. McAvoy, 138 N. Canter St., Reno.
Secretary—R. W. Shenrer, 215 Sierra St., Reno.
Meetings—Twice a month, 15th and 30th.

Oregon State Ass'n of Electrical Contractors and Dealers
President—R. C. Kenney, 388 Burnside street, Portland.
Secretary—J. Willis Oberender, 209-10 McKay Bldg., Portland, Ore.

Portland Local Ass'n of Electrical Contractors and Dealers
President—Roy C. Kenney, Portland.
Secretary—H. C. Jones,, 306 Concord Bldg. Portland.
Meetings—Alternate Mondays at Imperial Hotel Grill.

Sacramento Section, California Electrical Contractors & Dealers' Association
President—W. H. Gribble, Sacramento.
Secretary—H. Berg, Sacramento.

Washington Ass'n of Electrical Contractors and Dealers
President—V. S. McKenny, NePage & McKenny Co., Armour Bldg., Seattle, Wash.
Secretary—Forrest E. Smith, Seattle, Wash.
Meetings — Quarterly—second Thursdays of March, June, September and December.

JOBBERS' ASSOCIATIONS

Electrical Supply Jobbers Association
General Secretary—Franklin Overbagh, 411 So. Clinton St., Chicago, Ill.
Meetings—Semi-annual.

Pacific Coast Electrical Supply Jobbers
President—T. E. Bibbins, 575 Mission St., San Francisco.
Secretary—Albert H. Elliot, 544 Market St., San Francisco.
Meetings—Quarterly.

Electrical Credit Ass'n of the Pacific Coast
President—J. H. Zweifel, Electrical Appliance Co., San Francisco.
Secretary—Albert H. Elliot, 544 Market St., San Francisco.
Meetings—annually; San Francisco; May.

OF ELECTRICAL INTEREST

California Electrical Cooperative Campaign
Chairman Advisory Committee—L. H. Newbert, 445 Sutter St., San Francisco.
Secretary—Captain Howard Angus, New Call Bldg., San Francisco.

Colorado Electric Light, Power and Railway Association
President—E. A. Phinney, Jefferson Co. Power & Light Co.
Secretary-Treasurer—F. P. Safford, Denver Gas & Electric Co., Denver, Colo.

National Electric Light Association
President—R. H. Ballard, Southern California Edison Company.
Secretary—T. Comerford Martin, 29 West 39th St., New York.

Nebraska Section, N. E. L. A.
President—T. H. Fritts, Central Power Company, Grand Island, Neb.
Secretary-Treasurer—B. H. Conlee, Beatrice Gas & Electric Company, Beatrice, Neb.

Nevada Section, N. E. L. A.
Chairman—Geo. A. Campbell, Reno, Nev.

Pacific Coast Section, N. E. L. A.
President—A. E. Wishon, San Joaquin Light & Power Corporation, Fresno, Cal.
Secretary—A. H. Halloran, Journal of Electricity, Electric Bldg., San Francisco.
Meetings—Annually, in April.

Portland Section, N. E. L. A.
Chairman—F. H. Murphy. Portland Railway, Light & Power Company.
Secretary—Geo. Bowen, Portland, Ore.

Illuminating Engineering Society
President—S. E. Doane.
Secretary—Clarence L. Law.
Western Representatives—Romaine Myers, Bacon Bldg., Oakland, Cal.; C. M. Masson, Edison Bldg., Los Angeles; F. H. Murphy, Portland Railway Light & Power Company, Portland, Ore.; W. R. Putnam, Utah Power & Light Company, Salt Lake City; Fred A. Osborn, University of Washington, Seattle, Wash.
Meetings—First Tuesday each month.

New Mexico Electrical Association
President—D. W. Morgan, Las Cruces, N. M.
Secretary—Charles Twogood, Albuquerque, N.M.
Meetings—Annually, in February.

Southwestern Electrical and Gas Association
President—W. A. Sullivan, Shreveport, La.
Secretary—H. S. Cooper, 403 Slaughter Bldg., Dallas, Texas.

Northwest Electric Light and Power Ass'n
President—H. J. Gille, Puget Sound Traction Light & Power Co.
Secretary—W. E. Herring, Puget Sound Traction, Light & Power Co.
Meetings—Convention held annually. Executive Committee, governing body of Association, meets upon call of its chairman.

Los Angeles Jovian Electrical League
President—A. E. Peat, San Joaquin Light & Power Corp.
Secretary—Frank Weiss, Los Angeles Gas & Electric Corp.
Meetings—Every Wednesday, 12 m.

San Francisco Electrical Development League
President—Henry Bostwick, 445 Sutter St., San Francisco.
Secretary—J. W. Redpath, Rialto Bldg., San Francisco.
Meetings—Every Monday, 12:10 p.m.; luncheon, Palace Hotel.

Electric Metermen's Association
President—J. E. Bridges, Westinghouse Electric & Manufacturing Company.
Secretary—A. E. Coney, Great Western Power Company, San Francisco.
Meetings—About every 60 days.

Alameda County Electrical Club
President—George Drew, Pacific States Electric Company, Oakland, Cal.
Secretary—George B. Furniss, Pacific Gas & Electric Company, Oakland, Cal.

Synchronous Club
Secretary—H. N. Beecher, City Hall, Los Angeles.

Telephone and Telegraph Society of the Pacific Coast—San Francisco Section
President—W. H. Brommage, Pacific Tel. & Tel. Co., San Francisco.
Secretary—Chas. H. Dobson, 835 Howard St., San Francisco.

MECHANICAL ENGINEERS

National Officers
President—Mortimer E. Cooley, Electrical Engineering Dept., AnnArbor, Mich.
Secretary—Calvin W. Rice, Engineering Society Bldg., New York City.

San Francisco Section, A. S. M. E.
President—W. F. Durand, Stanford University, Palo Alto, Cal.
Secretary—Jas. A. Kinkead, Rialto Bldg., San Francisco.
Meetings—Quarterly.
Thursday lunches have been arranged at the Engineers' Club, 57 Post St.

Los Angeles Section, A. S. M. E.
President—Charles H. McGuire.
Secretary—T. J. Royer.
Meetings—Quarterly.

ENGINEERS' CLUBS

Oregon Society of Engineers
President—John W. Cunningham, 414 Spalding Bldg., Portland.
Secretary—Orrin E. Stanley, Box 973, Portland.
Meetings—Annual: First Monday in February.
Monthly: Third Thursday of each month.
Third Thursday of each month.

The Engineers' Club of Seattle
President—H. E. Horrocks, Seattle, Wash.
Secretary—E. J. Bartells, Northern Life Bldg., Seattle, Wash.
Meetings—Thursday noon at the club rooms at 410 Arctic Bldg. A buffet luncheon is served every day. A special welcome is extended to all engineers visiting the city.

Engineers' Club of San Francisco
President—A. E. Chandler, New Call Bldg., San Francisco.
Secretary—J. R. Brownell, Manufacturers' Indemnity Exchange, San Francisco.
Annual Meeting: October.

Idaho Society of Engineers
President — W. H. Gibson, Mountain Home, Idaho.
Secretary—Ira F. Shaffner, Boise, Idaho.

Engineers' Club of Oakland
President—R. S. Chew, Oakland Chamber of Commerce, Oakland.

Engineers' Club of Sacramento
President — George S. Nickerson, 914 Forum Bldg., Sacramento.
Secretary—P. M. Noeboe, State Department of Engineering, Forum Bldg., Sacramento.

Colorado Engineering Council
President—Arthur Ridgway, 810 Equitable Bldg., Denver.
Secretary-Treasurer—Robert J. Grant, 614 Interstate Trust Bldg., Denver.

United Engineering Societies of San Francisco
Chairman—C. D. Marx, Stanford University.
Secretary—Nathan Bowers, Rialto Bldg., San Francisco.

Joint Committee Technical Societies of Los Angeles
Chairman, George A. Damon, San Fernando Bldg., Los Angeles.
Secretary—W. K. Barnard, 705-6 Central Bldg., Los Angeles.

Utah Society of Engineers
President—Leonard Cahoon.
Secretary—Wm. H. Kelsey.
Meetings—3rd Wednesdays except May, June, July and August.
Annual banquet—May.

MISCELLANEOUS

American Ass'n for the Advancement of Science—Pacific Division
President—John Campbell Merriam, University of California; Acting Chairman National Council of Research.
Secretary (acting)—J. R. Douglas, 430 Library, University of California, Berkeley, Cal.
Meetings—Annual.

Portland Section A. S. C. E.
President—P. H. Dater, Eng. U. S. Forestry Service.
Secretary—C. P. Keyser, Park Bureau, Portland, Oregon.
Meetings—At call of president.

Spokane Engineering & Technical Ass'n
President—L. K. Armstrong, A. S. M. E.
Secretary—A. D. Butler, City Engineer, Spokane, Wash.
Meetings—Third Friday of each month. Joint with A. S. C. E., A. I. E. E. and A. S. M. E.

Foreign Trade Club
President—W. H. Hammer, Monadnock Bldg.
Secretary—Wm. E. Hague, Monadnock Bldg.
Meetings—238 Merchants Exchange Bldg., San Francisco. Every Wednesday evening.

Pacific Coast Gas Association
President—John D. Kuster, care Pacific Gas & Electric Co., San Jose, Cal.
Secretary—Henry Bostwick, 445 Sutter St., San Francisco.

Society for Promotion of Engineering Education
Secretary—F. L. Bishop, University of Pittsburgh, Pittsburgh, Pa.

HAPPENINGS IN THE INDUSTRY

INSPECTION TOUR OF CALIFORNIA RAILROAD COMMISSION

Members of the California Railroad Commission and representatives of the Pacific Gas & Electric Company recently completed an important six-day inspection trip in northern and central California, visiting 12 of the 13 hydro-electric plants of the company. The tour was taken as part of the commission's program of conferring with officials of the various power interests, to encourage greater production of electric energy.

The inspection party consisted of E. O. Edgerton, president of the Railroad Commission, and Commissioners Harley W. Brundige, Frank R. Devlin and Irving Martin. Others in the commissioners' group were H. G. Butler, power administrator; Gaskell Jakobs, assistant engineer, and E. T. McGettigan, recorder of the commission.

The representatives of the Pacific Gas and Electric Company in the party were John A. Britton, vice-president and general manager; A. F. Hockenbeamer, treasurer; John A. McCandless, director; C. P. Cutten, attorney; F. S. Myrtle, publicity manager; W. G. Vincent, valuation engineer, electric department, and F. A. Leach, Alameda district manager.

From Sacramento, Governor Stephens accompanied the party to the Drum plant on the American River, where he enjoyed an exhilarating ride on the precipitate tramway up the canyon-side.

RAILROAD COMMISSION REGULATIONS ON SERVICE

All gas served by gas utilities of California to consumers must now contain 570 British thermal units on an average each month with a variation of not more than thirty units. This is the fundamental requirement of new standardization of quality and service of gas utilities established by the Railroad Commission in its General Order No. 58, effective September 1. The order also provides a complete set of general rules governing the relations between gas utilities and their consumers. In addition, special rules governing the Pacific Gas and Electric Company's field have been authorized, and somewhat similar rules have been authorized for the electric service.

In order to regulate the gas supplied all California consumers the Commission's Gas and Electric division will, in September, expand its work and give regular attention to all the gas plants by inspection and testing and by every other form of supervision necessary to see that the public gets standard gas. The order prescribes operating schedules for gas plants with a view to improving efficiency and bettering service, and inspection of all gas plants and their operation by a gas inspector of the Commission.

The Commission requires that every gas bill shall set forth clearly the meter readings and the gas consumed, together with such other information as will make clear to the consumer that he is being correctly billed.

Standard methods are prescribed for the testing of gas meters, and utilities are required to make periodic tests and not allowed to install any meter which is inaccurate by more than 1 per cent. Utilities are required to make tests of gas meters upon request by consumers without charge except where the meter has been tested within six months prior to the date of the request, in which case a consumer may obtain a test by making a deposit depending upon the size of the meter.

While General Order No. 58 governs alike all gas utilities in their general service, the order may be amplified by special rules for most of the larger systems from time to time. These special rules are more in detail and modified according to the district affected and the basis of the manufacture and distribution.

The first special rules which cover gas are comprised in Decision No. 6543 of the Railroad Commission which authorizes rules and regulations governing the system of the Pacific Gas & Electric service.

The rules adopted are for gas and electrical service separately (electrical in Decision No. 6542) and the main points covered are the establishment and reestablishment of consumers' credit to obtain service, the return of deposits to be paid by the company, discontinuance of service, disputed bills and the method of adjusting them, meter tests and the adjustment of bills for meter error.

A dispute, of course, which cannot be adjusted by the observance of these rules will be handled by the Commission.

NEW INSTALLATIONS IN COLORADO

The Grand Junction Electric Gas & Manufacturing Company at Grand Junction, Colorado, has recently installed a 750-kva. General Electric turbine and generator to replace two Corliss engine units. Automatic stokers will also be added to the boiler equipment in a general revision of the plant.

NATIONAL ADVERTISING

A Letter to the Editor

I have just finished reading the article on page 166 of the August 15th issue of your valued magazine, written by Mr. Hugh Kimball. That section of the article referring to advertising can hardly be considered a just statement of facts.

Mr. Kimball admits that national advertising is a necessary adjunct to the marketing of any product, and then goes on to say that in proportion as it eliminates the retail dealer it becomes of less selling value. Frankly, I do not understand this statement, as I have no knowledge of any national advertising which does not build up the dealer and which advocates any principle other than the distribution of goods through the logical channels of distribution, i. e., manufacturer to jobber to retailer, and thence to the consumer.

Mr. Kimball states that by eliminating the expense of national advertising, the manufacturer of the cleaner he is selling is able to give the dealer better discounts, and intimates that like action by manufacturers of nationally advertised goods would be acceptable and desirable.

I am inclined to believe that the manufacturer of the cleaner referred to is possibly a local concern who is not attempting to nationalize his product, due perhaps to lack of plant capacity or capital to expand his business. Such a manufacturer could give his dealers larger discounts with the expectation that the dealer would create a demand locally for his product.

If the manufacturers of nationally advertised goods had not paved the way with persistent and continuous advertising in widely-read magazines, thereby selling the idea of modern housekeeping methods to the housekeepers of the land, it is questionable whether the local advertising of an unknown article would be productive. Surely, the spasmodic advertising of local dealers would not create the desire to buy, in the mind of the reader who had not previously heard of the device advertised.

In the personal desire for larger discounts, this particular retailer is overlooking the manufacturer's requirements entirely, and should realize that if it were not for national advertising creating a large demand so that factories are able to enjoy a continuity of production, retail prices would undoubtedly be higher and the margin of profit for the distributor would unquestionably be less. Furthermore, it is only by national advertising in the very best mediums that the manufacturer can ever hope to sell a sufficient quantity of his product to make manufacturing profitable.

In view of the erroneous impression which the average reader might obtain from Mr. Kimball's article, the writer will thank you to give these facts due prominence in an early issue of your-valued magazine.

Yours very truly,

H. C. HOPKINS,
San Francisco Publicity Division,
Westinghouse Electric & Mfg. Co.

The Pacific Coast convention of the American Institute of Electrical Engineers, which will take place in Los Angeles September 18-20, is the first which the Institute has held in two years, and for this reason is of more than usual interest. The exceptional program for the event was published in our last issue. It is hoped that there will be a very large attendance at this important gathering and that sections all over the country will make a point of having delegates in attendance, and keeping in touch with the developments. No Western engineer can afford to miss this convention.

TRADE NOTES

New Incorporation —

The Meyers Electric Safety Switch Company of San Francisco has been incorporated for $15,000 and has been given permission by the California State Corporation Commissioners to sell to the public 5,000 shares of stock at $1.00 per share. The company will engage in the manufacture and sale of enclosed externally operated safety switches, and the manufacture of metal cut-out and switch boxes.

New Branch Store —

Pass & Seymour, Inc., of Solvay, N. Y., announce the opening of a branch store under the management of the George Gray Company of San Francisco. Their growing business and their many friends on the Pacific Coast have brought about this extension, while the George Gray Company's established position in San Francisco will render them particularly capable of handling the Pass & Seymour line.

Removal Notice —

The Ward Leonard Electric Company, Mount Vernon, N. Y., manufacturers of Vitrohm, vitreous enameled, resistor units, lamp dimmers, rheostats and electrical controlling devices, announce the removal of the office of their Philadelphia representative, William Miller Tompkins, from the Commonwealth Building to the Bourse Building, Machinery Exhibit, Philadelphia.

Electric Furnaces —

The Electric Furnace Construction Company, Finance Building, Philadelphia, advises the receipt of an order from the Hammond Steel Company, Syracuse, N. Y., for one 3-ton furnace for the manufacture of high grade tool steels.

A Greaves-Etchells Furnace is also being installed for the Hong Kong Foundry Company, China.

New General Manager —

The Richardson-Phoenix Company, lubrication engineers and manufacturers of Milwaukee, Wis., announce the appointment of L. E. Strotham, formerly manager of the Steam Turbine and Pumping Engine Departments of the Allis-Chalmers Manufacturing Company, to the position of general manager of their firm.

New Store —

Smith-McCoy Electric Company have moved to 104 Fifth street, Portland, Oregon. Their new store is the last word in neatness of arrangement and appearance.

Change of Offices —

The office of the Hemingray Glass Company at Covington, Ky., has been combined with the office at their factory, Muncie, Ind. The change was made beginning Sept. 8th.

LATEST IN EVERYTHING ELECTRICAL

(Switches for special purposes and of various new designs are featured in this review of recent industrial developments, including a new switch for high tension transmission. The growing prominence of the safety idea is illustrated by a Westinghouse rheostat which is enclosed in a steel cover with special insulation.—The Editor.)

SAFETY ENCLOSING COVER FOR CONTROLLING RHEOSTATS

As a result of almost continual wide-spread "Safety-First" campaigns, the necessity for safeguarding all machinery and those who operate it is now generally recognized throughout the realm of industry as a matter of vast importance. In the electrical field rapid progress has been made in the past few years in designing new lines of apparatus, and redesigning old ones to make the safety feature more prominent; particular attention has been paid to motor control device because, as a rule, this class of apparatus is handled either by unskilled labor or by those not familiar with electrical machinery, and the necessity for a fool-proof installation is the more obvious.

Westinghouse Rheostat ready to attach cover, showing adapters replacing nuts, and fibre tube replacing handle.

The fact plate rheostats manufactured by the Westinghouse Electric & Manufacturing Company of East Pittsburgh, Pa., are protected, and the enclosing covers are so designed that they can readily be applied to old rheostats to make old installations strictly modern.

The enclosing cover is a solid sheet steel box which fits tightly against the rheostat base and is secured by four corner bolts. Pivoted to the cover are two cast iron arms, one with the operating handle on the outside, and one within made with a fork to engage the rheostat handle. To apply a safety cover to an old rheostat it is only necessary to remove the four nuts on the corner studs of the face plate and replace them with adapter nuts and studs, furnished with the cover. The rheostat handle is also removed and a fiber tube substituted. The cover is then put on so that the fork on the inner arm engages the insulating tube and the four nuts that were on the original rheostat are used to fasten the cover in place. The lead wires from the rheostat are brought through insulating bushings that are held in place by the edge of the cover. While no packing is used to make the cover water-tight, it fits so closely that it effectually prevents the entrance of metal chips, saw dust, or other material that would cause injury to the rheostat. The cover is grounded through the corner bolts and being insulated from live parts, renders it fool-proof and makes it impossible for an operator to accidentally receive a shock through coming in contact with the working parts of the face plate.

Westinghouse Rheostat with Face Plate Cover attached

The use of these covers or similar devices is one of the important requirements of the modern factory or machine shop, and in some localities it is demanded by law. These covers fulfill all requirements of a safety-first device and are easily and readily installed.

SWITCHES FOR HIGH TENSION TRANSMISSION

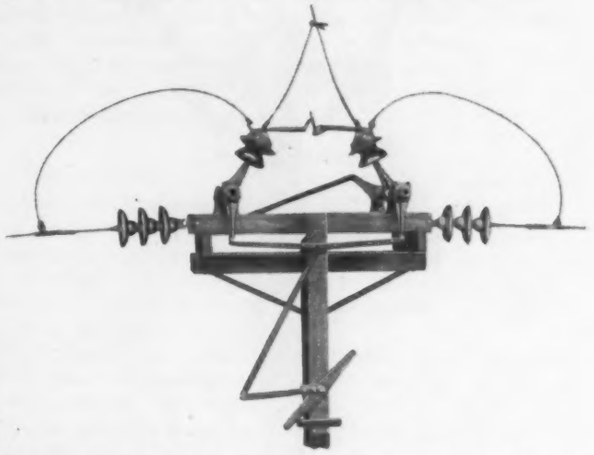
The George Cutter Company of South Bend, Ind., are placing on the market the first items of a line of high tension transmission equipment which will be sold under the trade name of "Clear Break Equipment."

The first of these items is an outdoor air break switch which is designed for rupturing load current under the most severe conditions. This switch is designated the Type "T" switch, and will be furnished regularly in 150-200 ampere capacities and for rated voltages of 22, 33, 44, 55 and 66,000. Developments now under way will take care of voltages of 90,000 to 150,000 and higher if desired.

These switches will be furnished hand operated automatic or non-automatic overload release, also motor operated automatic or non-automatic overload release. Inasmuch as standard series and shunt trip mechanisms will be used in connection with standard circuit closing relays, time element devices are readily applicable.

The switches may be obtained in one, two or three-pole arrangement, and are readily mounted on wooden poles or steel towers.

The Type "T" switch is provided with an auxiliary or arcing contact (not a horn) which ruptures the line current at its tip when opening. The arc is thus drawn at a point well above the grounded framework and is drawn in a vertical plane parallel to the phases. This prevents shortening of phase spacing in opening and this, in connection with the quick, long break given, insures prompt interruption of the current.



View showing one leg of the Type T 33,000-volt switch in closed position. This switch is provided with an auxiliary contact which ruptures the line current at its tip when opening.

The second item announced at this time is a line of switches known as the Type "D," which are designed for disconnecting purposes only but are arranged to operate all legs of the switch simultaneously from a ground lever which may be readily locked in either the open or closed position.

The especially novel feature in connection with the Type "D" line of switches is the fact that only a pole and the

strain insulators for dead ending are required for mounting the switch. The switch framework consisting of 3-in. by 4-in. angles, furnishes the necessary double arming for dead ending the lines on each side.

These switches are furnished with insulators rated at 22, 33, 44, 55 and 66,000 volts and all give a little more than two feet of clear separation between live parts when switches are in the open position. No auxiliary contacts are provided on the Type "D" line of switches to prevent blistering of the main contacts in case of opening with line current.

The special difficulties which this equipment was designed to overcome may be summarized as follows:

1. Striking between phases when opening.
2. Striking to ground when opening.
3. Contacts burning and welding so they cannot open.
4. Contacts freezing from ice so they cannot open.
5. Contacts freezing from ice so they cannot close.
6. Mechanical shock or blow to insulators causing breakage and failure of same.
7. Insulators often under torsion causing separation of units and failure.
8. Dependence on horns to carry arc upward and stretch to rupturing length.

A very noteworthy feature of both the Type "D" and "T" switches is what is known as the spring type of contact for the main current carrying capacity. These contacts are identical for all of the Type "T" and "D" switches rated from 22 to 66,000 volts and consist of a multiplicity of parallel spring wires each seating in a "V" notch in the other member of the contact and arranged to be bent back when in the closed position so as to exert a pressure against the notch. This insures a constant large carrying capacity by each one of these wires which under tests of 10 to 12 times their rating

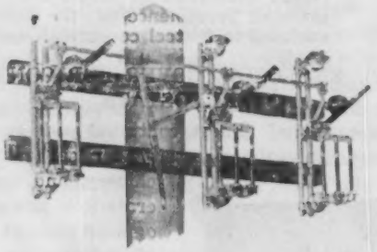
One leg of the Type "D" switch for 44,000-volt service, in open position. A double angle brace is provided for each stringer angle to give ample rigidity of construction.

have shown no injurious results. This contact was designed to meet the great demand for a contact which would stand up and continue to give satisfactory service under ice conditions, and would also not weld electrically and prevent opening. Good seating is insured by a wiping action.

On all of the Type "T" and "D" switches for voltages from 22 to 66,000 standard pin type insulators with ¾-in. separable thimbles are used, and the insulator caps are held on by specially formed rings in the groove under which set screws in the cap are engaged, forcing the cap down rigidly on to the top petticoat of the insulator. The set screws exert no direct pressure against the porcelain.

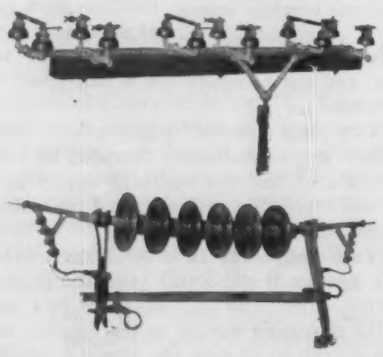
SPECIAL SWITCHES

Lines of specially designed switches with distinctive features are being advertised by the Pacific Electric Manufacturing Company of 827 Folsom street, San Francisco. One known as the Type 413 switch is equipped with self-renewing fuses, the lower ends of the fuses being separated by explo-



Type 413 switch, equipped with self-renewing fuses. The blowing of the fuse explodes a cartridge which cuts in the next fuse.

sive cartridges in such a way that the blowing of the fuse causes a gap discharge in the cartridge, exploding it and cutting in the next fuse. The switch is very powerful at the time of its travel when it is forcing the blade into or out of the contacts, having a toggle joint or minting press motion



Above is a group controlled, type 200 switch which has a control operated from the ground; below, the Pacific Strain Insulator Switch.

that makes the switch very easy to operate. The control can be installed, without change, on switches mounted vertically or horizontally.

Another, known as the Pacific Strain Insulator Switch, has wide flaring, self-aligning contact jaws, a positive latch which can only be released by the operator's handle and a wide based, well braced blade.

The chief feature of this switch is that the hinge and contact posts are mounted on cylindrical supports so that they can be moved apart or together to provide for sag or insulator irregularities, or can be rotated around the insulator center to adapt to any twist in the line. Another feature is the extension of the hinge post, on which is mounted a flat spring, limiting the travel of the blade and making it very much easier for the operator to start the closing motion. This feature is particularly valuable when the switch is approached from an awkward angle.

The Type 200 group controlled switch has a control operated from the ground. In operation, the fuse supporting portion of the switch is moved sideways, disconnecting it and making it possible to replace the fuses. The same control can be used with the switch mounted either vertically or horizontally. The switch has self-aligning contacts, and is heavily galvanized. Provision is made on the fixed bases to attach strain bobs or insulators.

Books and Bulletins

McGraw Central Station Directory

The 1919 edition of the McGraw Central Station Directory and Data Book contains about 875 pages of completely revised data on 6,000 lighting plants.

During the past year there have been some 22,000 changes in central station statistics, and no old list can be a substitute for the 1919 edition. In the state of Iowa, for instance, there is practically no company in which there have not been from one to a dozen or more changes since the previous list was published.

Eighteen thousand changes are recorded in name, capital, bonds, personnel, equipment, distribution system, price of fuel and city lighting contract.

Four hundred companies are listed for the first time.

Four thousand companies either retailing electrical appliances or doing electrical contracting (or both) are definitely indicated by symbols, for easy reference.

New and valuable features are figures on the number of meters in service; population reached, and kw. connected power load. The information is definite, vital, authoritative and complete—the useful kind of data that is practically indispensable to a company now doing business with or planning to reach the central stations. Neither labor nor expense has been spared to make the new volume the most comprehensive of its kind.

The Spotlight

An interesting notion in the way of publication is a small illustrated monthly called "The Spotlight," issued by the Inter-Mountain Electric Company of Salt Lake City, Utah,

This is the cover of the August number of the Spotlight—a monthly publication issued by an electrical company of Salt Lake City and sent out to dealers to keep them in touch with the newest devices in the electrical field.

and Pocatello, Idaho, and sent out to dealers in automobile accessories and electrical supplies. It contains various brief illustrated accounts of new devices, as well as general display advertising. In addition there are short articles on advertising and other features helpful to the retailer. For the enlivenment of the too serious-minded dealer a page at the end is devoted to anecdotes. The cover is executed in regular magazine style—the August 1919 design being shown in the illustration.

Electrical Testing Devices

The Western Electro-Mechanical Company of Oakland, California, have recently issued a small pamphlet describing their testing equipment for taking load surveys of both a.c. and d.c. networks, industrial plants, transformer or motor loads, etc., and their Form A Phantom Loads for meter testing. The booklet contains some 22 pages, well printed and illustrated.

Graphic Meters for General Testing

In a recent number of the Graphic, issued each month by the Esterline Company of Indianapolis, the many advantages of instruments which write down their own records are pointed out.

Cash books have given way to cash registers; adding machines have taken the place of pencils and paper; the human element tends to be eliminated from all systems of records.

In no field is this more pronounced than in that of electrical testing. Here the quantities to be measured and recorded vary widely and rapidly from instant to instant; in many cases the rate and character of the fluctuations, as well as actual values, must be known, and the graphic, curve drawing instrument, which measures and records every value and variation, is rapidly replacing indicating instruments for general testing work.

The Esterline Company has compiled a booklet of graphic records showing the load characteristics of various industries and operations with an analysis of each curve.

The Best New Books

"The Booklist," issued monthly by the American Library Association Publishing Board, Chicago, is a reliable and helpful guide to the best new books in all fields of activity. Of interest, among those listed in the issue for July, 1919, is "Public Utility Rate Fixing" by C. E. Grunsky, recently published by the Technical Publishing Company.

Forestry Publications

The U. S. Department of Agriculture announces several publications relating to the forest problem, one of which is by William B. Greeley of the United States Forest Service. It is entitled "Some Public and Economic Aspects of the Lumber Industry"; it outlines the conditions which obtain in the lumber industry, discusses the returns on timber investments in lumber manufacture and in lumber distribution, analyzes the underlying causes of instability in the industry, and sets forth what the situation calls for. All the publications are available for free distribution.

"The Electrician"

The 1919 "Electrician," the Directory and Handbook of the Electrical Engineering and Allied Trades, published by Benn Brothers, Ltd., of 8 Bouverie Street, London, England, is the thirty-seventh of the annual issues.

Besides the extensive revision a number of improvements have been introduced, among them thumb-holes and tabs to facilitate reference.

The new issue contains about eighty pages more than the last one, all data having also been carefully brought up to date. It is a reliable and inclusive work of reference, and of great practical value to the electrical industry all over the world.

New Street Car and Window Cards

In addition to the other dealer's helps which the Cutler-Hammer Manufacturing Company of Milwaukee, Wis., has prepared for use in connection with the national advertising on the C-H 7050 Switch, they are now distributing two new four-color display cards. One shows an electric iron and cord with a young woman in the act of pushing the switch "on." The other carries a striking illustration of a toaster and cord equipped with one of the switches as part of a typical breakfast setting. Each has a prominent legend stating that "the buttons tell when the current is on or off." When used solely for street car advertising, these cards are imprinted with the dealer's name and address, and whenever they are desired for use as window or wall display cords, a suitable legend is imprinted in the space provided for the dealer's name and address.

NEW ELECTRICAL DEVELOPMENTS

(Municipal undertakings, both in power projects and city extensions and improvements are features of recent Northwest news. The Pacific Central District reports various important water applications and irrigation plans, and the Pacific Southwest a number of reservoir plans. Reports of new installations and general items regarding public utility service come from the Intermountain District.—The Editor.)

THE PACIFIC NORTHWEST

ANACORTES, WASH.—The transfer of the water system from the Washington Power, Light & Water Company to the city of Anacortes, Wash., has been made.

GRANTS PASS, ORE.—The California-Oregon Power Company is arranging for a transmission line from Medford to Roseburg, where it is understood they will cut in with the Umpqua Power Company.

TACOMA, WASH.—The city lighting department of Tacoma is getting ready to install a 1500-kva. 3-phase outdoor type Allis-Chalmers transformer, to be used for supplying power to a considerable number of Allis-Chalmers motors at the sawmill of the St. Paul & Tacoma Lumber Company in the city.

PORTLAND, ORE.—A movement is on foot to bond the city of Portland for $25,000,000 for the purpose of harnessing adjacent water powers and selling the power at cost to manufacturers. It is claimed that 3,000,000 horsepower tributary to Portland is going to waste.

BANDON, ORE.—The possibility of a municipal electric power plant for Bandon was discussed at a recent meeting of the city council and it was decided that the proposition warranted an investigation. It was arranged for the mayor, a number of councilmen and a committee of citizens to accompany an engineer on a trip to the Elk River country in northern Curry county for the purpose of looking over proposed sites.

SPOKANE, WASH.—Lewiston and Walla Walla men have incorporated the Electric Equipment Company, which has filed its articles in Spokane county. The company will do a general business in electrical light equipment and will have offices in Lewiston, Walla Walla and Colfax, and afterwards in Spokane. The incorporators are Bert Ferris and A. H. Cash of Lewiston, K. Harian and C. O. Hawkinson of Walla Walla and R. J. Cosman of Colfax. They have incorporated for $25,000 capitalization.

SEATTLE, WASH.—Outlays aggregating the sum of $459,800 for betterments of the city light and water plants were authorized by the city council Wednesday in connection with the preparation of the 1920 budget. The council also approved a budget estimate of $1,520,335.50 for supplies in the light department against an appropriation of $1,119,678 for the same purpose in the 1919 budget, and $173,300 for supplies in the water department, against $133,356.60 appropriated for the purpose in the 1919 budget.

TACOMA, WASH.—Tacoma's election on the Lake Cushman power site carried by a vote of 2,721 to 1,291. Action of the citizens gives the city council the right to complete negotiations for the purchase of the Lake Cushman power site together with the flowage rights, right-of-way to construct a power line from the site in Olympia to Tacoma, all present leases on the property itself from the Skykomish Power Co. and its allied interests, which have agreed to deliver the project in toto to the city for $300,000.

SEATTLE, WASH.—Sealed bids will be received by H. W. Carroll, city controller, up to noon of September 27 for the purchase of $1,250,000 municipal light and power plant and system bonds, the bonds to be in denominations of $1,000 and dated October 1, 1919, interest not to exceed 6 per cent. A certified check upon a national bank or trust company, or a cashier's check upon a national bank or trust company or a state bank within the city of Seattle, must be tendered for two per cent of the par value of the bonds.

EVERETT, WASH.—The first definite steps toward the acquisition of a municipally owned and controlled electric light, heat and power plant were taken by the city commissioners of Everett, Washington, when they instructed H. E. McDonnell of the firm of Burns & McDonnell, Kansas City, contracting engineers, to collect data regarding the local holdings of the Puget Sound Power Company. It is probable, in view of the investigations made, that a power plant proposition will be submitted to the voters at the November election and that from the data collected by the engineer some plan for financing the power plant proposition will be worked out.

SEATTLE, WASH.—An ordinance appropriating about $432,000, which will be used in construction of power site road, sawmill, temporary electric plant and for the preparation of specifications and plans covering the Skagit project will be heard by the council. The finance committee has recommended passage of the ordinance. Mayor C. B. Fitzgerald of Seattle has recommended that development of the Skagit river power project by the city should be done under the direction of an engineer who has specialized in hydroelectric construction, holding that the city engineer has too much other business to look after to be able to devote the time required on a project as large as the Skagit.

ASTORIA, ORE.—The Pacific Power & Light Company has closed a deal for the purchase of a 15-acre tract of land on Young's Bay at Astoria, Oregon, on which it will soon begin construction of a large power, light and gas plant, according to announcement made by head officials of the company. Adequate energy for all purposes will be provided in the new power plant, and a system of distribution installed that will serve every branch of industry in the lower Columbia river project. The cost of the improvement is estimated at $75,000 and includes a gas-making plant in conjunction with the electric power provided. Electric generators have been ordered in the East and a portion of the equipment is ready for shipment.

SEATTLE, WASH.—A further contribution to the power supply of Seattle was made recently by the interconnection of the transmission lines of the Puget Sound Traction Light & Power Company and those of the Intermountain Company, which links up the Washington Water Power and its great hydraulic plants of the east side with the hydroelectric plants of the Puget Sound Traction Light & Power Company. The Washington Water Power Company added 14,000 horsepower of machinery as a result of the electrification of the Milwaukee Railroad and the same amount of machinery was added to the plant of the Puget Sound Traction Light & Power Company for the same purpose. In the combined system are 1500 miles of transmission lines.

OLYMPIA, WASH.—Asserting that petitions for service under the proposed increased extension rates for lighting where consumers are not on an established line, are greatly in excess of the protests filed with the commission against the proposed new rates, the public service commission of Washington has rescinded the order suspending the tariff schedule recently filed by the Puget Sound Traction Light & Power Company of Seattle. Under the proposed tariff the company will charge a minimum of $2 a month for each customer where the extension requires one pole and $3 a month where two poles are required. Two dollars a month each is charged where the two customers are on one extension requiring 2 poles. A minimum of $1.50 is charged where only a service extension is required. Customers will be compelled to contract for service for a period of three years.

THE PACIFIC CENTRAL DISTRICT

MARYSVILLE, CAL.—A resolution formally approving the formation of the Cordua irrigation district has been passed by the board of Supervisors.

SONORA, CAL.—The Melones Mining Company is installing an electric plant, using the ditch water. Power will be sold to the Sonora and San Francisco Power Company.

AUBURN, CAL.—A committee has been appointed to ascertain the sentiment of the orchardists of Placer county regarding the formation of an irrigation district to embrace the entire county.

OAKDALE, CAL.—Notice of the intention of the Oakdale Irrigation District to proceed at once with the construction of the million and a half dollar reservoir at Melones was served recently upon the South San Joaquin Irrigation district.

PETALUMA, CAL.—The Petaluma-Santa Rosa Electric Railroad plans to extend its line from Forestville to the Walls-Ford bridge across the Russian River. The supplying of gravel at small cost for the new highways will no doubt be considered in the granting of the right of way.

CHICO, CAL.—J. W. Northedge was granted a franchise by the Board of Supervisors to operate an electric lighting plant in Richvale, the current to be supplied by the Pacific Gas & Electric Company and retailed to the consumer by Northedge. The system will be installed at once and will serve all parts of Richvale.

SAN MATEO, CAL.—A report published recently stating that the United Railroads electric line at San Mateo and the Peninsula Electric Railways at Palo Alto are to be connected by extending the tracks from San Mateo to Palo Alto was denied by Manager Chapin of the Peninsula Railways.

DUNSMUIR, CAL.—Arthur L. Coggins, of Dunmuir, has made application to the State Water Commission for 300 cubic feet per second of the waters of Upper Sacramento River, in Box Canyon, Siskiyou county, for the generation of electrical energy, with storage of 17,000 acre-feet. The use to which water is to be applied is the sale of power and pumping water for irrigation in connection with this project. The cost of the proposed works is $431,900.

MODESTO, CAL.—The proposition of the Modesto Gas Company to sell its street lighting Company in the city and convert it into an electrolier system was accepted by the city council on recommendation of Commissioner Cuneo of the council. Mayor George J. Ulrich, Commissioners Cuneo and Alvin Turner were named a committee to make and close the negotiations. The cost of lighting under the electric system will be about half, according to the figures presented to the council.

PORTERVILLE, CAL.—An important movement along the lines of irrigation was started for the eastern part of the county when the shareholders of the South Tule Independent Ditch Company voted to proceed with a plan looking to the ultimate impounding of the waters of the South Tule river. A committee consisting of Hobart Webster and Robert Horbade was appointed to ascertain the cost of the proposed project, and suitable sites for the dam.

PORTERVILLE, CAL.—Officials of the Central Counties Gas Company stated that bids have been received for the construction near the north city limits of a gas holder which will have a capacity of 125,000 cubic feet or more, sufficient to handle the demands of the consumers in Porterville in case of any interruption in the supply from the central plant in Visalia. It is stated there is to be no delay in letting the contract and that construction will be completed as rapidly as possible.

MODESTO, CAL.—After approval by the Modesto irrigation district board of the final report on the cost of the Don Pedro project, also of the power plant there, and of the enlargement of the main canal and drainage extension, the document was forwarded to the State Irrigation Bond Commission for approval, preliminary to the election for the issuance of bonds. The Turlock Irrigation District share of the Don Pedro cost will be twice that of the Modesto district. Both are to jointly build the project.

MARTINEZ, CAL.—Suit was filed by D. J. Hall of Richmond in which the people of the state of California are named as plaintiff against the San Francisco-Oakland Terminal Railroads to restrain that company from permitting electric current from its rails to pass through the earth and cause disintegration of metals anchored underneath the soil. A similar suit was filed against the railroad by the Standard Oil Company of Richmond several days ago. It is claimed that the trouble can be overcome by insulating the rails.

SAN FRANCISCO, CAL.—The State Water Commission has granted to the Sierra & San Francisco Power Company of San Francisco 150 cubic feet per second of the waters of the South Fork, Stanislaus River, for power purposes. The diversion dam is to be 11 feet high, 52 feet long on top and 46 feet long on the bottom, of masonry and concrete. Ditch and flume will be 4.63 miles long. Water will be used for development of hydroelectric power, to be distributed by the applicant as a public service corporation. The estimated cost of the proposed works is $740,000.

SAN FRANCISCO, CAL.—The application of E. A. Walters, Berkeley, Cal., for 400 cubic feet per second of the waters of Bucks and Grizzly Creeks, Plumas county, tributary to the North Fork Feather River, for generating electricity for power purposes, has been granted by the State Water Commission. Diversion works will consist of a masonry dam 10 feet high, 40 feet long on top and 20 feet long on the bottom, and a canal 10 miles long. The amount of water to be stored is 60,000 acre feet. The storage dam is to be 140 feet high, 300 feet long on top and 60 feet long on the bottom, of gravelly soil tightly compacted with concrete core. The estimated cost of the proposed works is $4,000,000.

TURLOCK, CAL.—The construction department of the Turlock Irrigation District is preparing to spend about a quarter of a million dollars of the district's money in extensions and repairs during the off-season, or period when the water is out of the ditches. They will continue their operations until the water comes on again next March. One hundred and fifty men will be employed during most of this time. Some of the items on the program are: lining about six miles of canal with 785,000 sq. ft. of concrete at a cost of $95,000; digging about 15 miles of drainage ditches at a cost of $104,000; clearing out the main laterals and putting in new structures, falls, etc., at a cost of $26,000; enlarging a section of the main canal which takes water out of the river below the La Grange Dam, $15,000.

THE PACIFIC SOUTHWEST

LOS ANGELES, CAL.—The Pacific Electric Company has been granted a franchise to construct and operate a single railroad track upon and across Central Avenue.

LOS ANGELES, CAL.—The Pacific Electric Railway Company has let the contract to Jay B. Harris for the construction of a brick, concrete and steel substation at 635 Maple Avenue for $5,240.

LOS ANGELES, CAL.—Application has been made to the city council for a certain franchise granting the right to construct a double electric street railroad track along Maple avenue from 7th to 32nd street.

WHITTIER, CAL.—The Southern California Edison Company has been given a permit for the erection of a brick building 100 x 100 feet at the corner of Greenleaf and Penn, to be used for a shop and garage. The cost will be $20,000.

SANTA FE, N. M.—The Springer-Colmor Irrigation and Land Company, W. H. Wolf, president, announces that the capacity of its reservoir will be increased to 26,000 feet, and arrangements made for irrigation of land under the Cary Act.

LANCASTER, CAL.—A special election has been called to vote on the formation of Los Angeles County Water District No. 4. The object is to secure land upon which to sink wells and erect necessary buildings. The bond issue is for $250.000.

OWENSMOUTH, CAL.—San Fernando Reservoir No. 1 will be constructed, at a cost of $150,000, to provide storage for about 2500 acre-feet of water. A wall 85 ft. high and 1,235 ft. long at the top will be constructed a mile west of the San Fernando reservoir.

TUCSON, ARIZ.—Construction work on the San Carlos dam will begin at once. A conference of 1500 Arizonians was held at Florence for the purpose of effecting a permanent organization. This dam will furnish water for the irrigation of 250,000 acres of land.

LOS ANGELES, CAL.—Pursuant to Article 19, Trust and Indenture dated Sept. 1, 1903, between the Los Angeles Pacific Railroad Company and the Los Angeles Trust & Savings Bank, to secure an issue of Los Angeles Pacific Railroad Company first and refunding mortgage 5 per cent gold bonds dated Sept. 1, 1903, the bank as trustee has invited tenders for sale to it of said bonds in an amount to the extent of moneys deposited in the sinking fund—$9,286.81.

INDEPENDENCE, CAL.—P. C. Montgomery and C. H. Johnson of Independence have made application to the State Water Commission for 20 cubic feet per second of the waters of Little Pine Creek, Inyo county, tributary of Owens river, for generating power for a quartz mill, concentrators, etc. The diversion works consist of a concrete dam, and main pipe line 6.08 miles long. The amount of power to be developed is 726 t.h.p. The water is to be returned to Little Pine Creek after use. The estimated cost of the proposed works is $30,000.

PASADENA, CAL.—When the city of Pasadena, which operates its own electric light and power plant, went outside the territory defined as the city of Pasadena and sold electric energy to the Raymond Hotel and other customers located in the city of South Pasadena it became as other public utilities, subject to the jurisdiction of the Railroad Commission. So declares the commission in an opinion handed down in the case of the Pacific Light and Power Corporation against the two Pasadenas. Accompanying the opinion is an order directing the city of Pasadena to immediately file with the Railroad Commission its schedule of rates.

THE INTER-MOUNTAIN DISTRICT

ST. ANTHONY, IDA.—City officials are seriously considering the installation of a white way street lighting system for the business district.

FIRTH, IDAHO.—The people of this community are making an effort to secure electric service from the Utah Power & Light Company.

BOISE, IDA.—Fire broke out recently in the power house of the Idaho state penitentiary and caused damage to the power house estimated to be between $800 and $900.

BOISE, IDA.—The State Board of Equalization has decided to increase the assessed valuation of the public utilities in this state on account of the necessity of increasing revenue.

LOGAN, UTAH.—The Utah Power & Light Company has made application to the State Engineer for permission to divert 125 second feet of water from Logan River for power purposes.

LOGAN, UTAH.—This city is advertising for bids covering the installation of a rather elaborate street lighting system for the business district, to consist of one hundred and twenty lamps.

PRESTON, IDA.—The Utah Light & Power Co. has been granted its application for permission to remove a certain line of poles, and to replace the same by a transmission line supported on 55-foot wooden poles.

FOUNTAIN GREEN, UTAH.—Permission has been granted to the Big Springs Electric Company of this city to install a meter system in connection with its lighting plant, by order of the Public Utilities Commission.

BOISE, IDA.—The Public Utilities Commission has just issued an order granting permission to the Utah Power & Light Company to widen the scope of its operations in Idaho. Construction work has been greatly restricted during the period of the war.

PAROWAN, UTAH.—Application has been made by the municipal plant to the Public Utilities Commission for permission to cut out flat rate service and to raise the electric lighting rate from seven to nine cents per kilowatt hour. No action has been taken by the Commission.

AMERICAN FALLS, IDA.—Preliminary surveys by government engineers are under way with a view to the erection of an immense impounding dam in the Snake river between the Oregon Short Line Railway bridge and the wagon highway bridge. The dam will furnish irrigation for approximately 600,000 acres of land and will cost $20,000,000.

IDAHO FALLS, IDA.—On account of the drought with resulting low water the Idaho Falls municipal plant was compelled to shut down recently. The citizens were without electric service for several days. Arrangements were finally made with the Utah Power & Light Company for current to supply the city until the plant can again be operated.

SANDPOINT, IDA.—A contract has been closed with the Calispell Light & Power Company, Dalkena, Wash. (which purchases electric current from the Sandpoint division of Mountain States Power Company), covering 40 horsepower in motors for the Dalkena Lumber Company, with prospects of an additional 100 horsepower. All reports indicate that the lumber companies in this district are increasing capacities and have acquired timber enough to keep them running several years.

KALISPELL, MONT.—Several electric pumps have been installed by the Kalispell division of the Mountain States Power Company for ranchers in the vicinity of Kalispell—one 40 horsepower, another 15 horsepower and one 7½ horsepower—with prospects for several more. Requests for new extensions are being made in the town of Whitefish, which is served by the Mountain States Company, and the Great Northern Railway at this point is negotiating with the company for power to operate part of its shops.

THE VACUUM CLEANER —— THE VACUUM CLEANER

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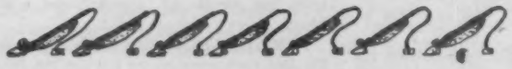
KEEPING SCRAP PAPER for thirty days before destroying it is the practice of one bank reported elsewhere in these pages. There are apt to be checks and other valuables lost otherwise. This page is the substitute for that practice. In order that the many valuable odds and ends which flutter about the editorial rooms, and are so likely to find their way into the waste basket, may not be mistaken for scrap paper and destroyed, they are carefully sorted out and presented here in an array of miscellaneous interest under the supervision of that electrical janitor, the Office Vacuum Cleaner.—The Editor.



The Welshrarebit and not Professor Bliss' course must be held responsible for the following nightmare which recently arrived anonymously in the editor's mail:

THE ELECTRICAL STUDENT'S NIGHTMARE
(After combining Professor Bliss and Welsh rarebit)

Two huge and hungry dynamos
Are crouching in the gloom
While swarms of little kilowatts
Go crawling 'round the room.

I step upon resistance coils
That twine around my feet,
While gloatingly on every wall
The ampere meters mete.

A volt leaps on the bed and shrieks
"D.c.! a.c.! d.c.!"
And while I stop my ears he hurls
A pile of ohms on me.

I struggle out and try to run
But find my leaden feet
Are wired up in series with
A stove across the street.

A little bit of lovin' is recommended as a cure for failure of all sorts in this worth-while bit of poetry. It is by Houston Post and it appeared in the P. T. Magazine.

If you put a little lovin' into all the work you do,
And a little bit of gladness, and a little bit of you,
And a little bit of sweetness, and a little bit of song,
Not a day will seem too toilsome; not a day will seem too long;
And your work will be attractive, and the world will stop to look,
And the world will see a sweetness, like the tinkling of a brook,
In the finished job; and then the world will turn to look at you
With a world's appreciation of the thing you've found to do.

Just a little bit of lovin', and a little bit of song,
And some pride to sort of make it straight and true and clear and strong;
And the work that you're a-doin', pretty near before you know,
Will have set the world a-talkin', and the little winds that blow
Will bring echoes of it to you, and you'll see that you have done
More than you had dreamed or hoped for when the task was first begun,
And you'll find the bit of lovin' you have put into the same
Has come back to you in lovin', and come back to you in fame.

HOUSTON POST.

A Japanese janitor, employed at one of the Pacific Telephone and Telegraph Company exchanges in Southern California, in the following communication addressed to his superior, thus details the disappearance of a broom and expresses his desire for another:

Mr. Johnson: I ask for you, the janitor has one broom, and last Monday day time some man take out, you know who do it is? And I must use to every night. Please for me one broom.

G. OWARA.

The Old Days are supposed to be the golden days, but there are some few things which modern science has improved. One of them is the telephone service. Here is an account of the original telephone exchange in Spokane which was installed in 1888, told by one of the operators of those days as it was reported in the Spokane Chronicle:

There was one main operating room where the telephone girls sat before a switchboard of fifty subscribers.

Things weren't as nice then as they are now. Everything was crude and there was much more work for the operator of those days than for the operators of today. When we wished to call a number we used to have to push a button with one finger and at the same time turn a crank with the other hand. Then if a party wanted a number, a little blind over the number of the party signaling would drop down, showing the number calling.

Our work was much lightened, however, by the manner in which the people of the town treated us, always showing us every consideration. Whenever the store owners wanted to make a number of calls in succession they always appreciated the trouble it was for us and sent us a box of oranges, or candy. Every one knew every one else in the town at that time and consequently we always knew who was asking for a party. And though we had telephone numbers in those days they were hardly ever used. If John Jones wanted to call Henry Smith, whose number was "24," he never asked for the number, but simply requested that we ring Henry. And before any one ever called a number he would usually chat for a while with the telephone girl, asking about the folks at home, the garden, and the new family that had just arrived in town. Then when the talk was finished he would call his party. It was just like home then.

"Be pleasant until ten o'clock in the morning," says one electrical man, "and the rest of the day will take care of itsef."

The hard road of the meter reader is just beginning. You have heard of the company's meter man who reported twenty-five houses on his rounds which had all the doors to the cellar locked and the key in the personal pocket of the man of the house. Well, here is another one of the little incidents which make his life worth living:

Man at door: "I'd like to see the meter."
Housewife: "Well, it's pretty busy, but I suppose you can see it for a moment."

What would you do in answer to this letter which is passed on by the Western Electric Company? One of their installers writes them to say:

"The attached material was lost. Please sent it as soon as possible."

Apparently the material really was lost, for there was nothing attached to the communication.

FOOLISH SELLING ARGUMENTS—II

When making an after dinner speech, the best way to make your toast warm, crisp and attractive is to use an ELECTRIC TOASTER.

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